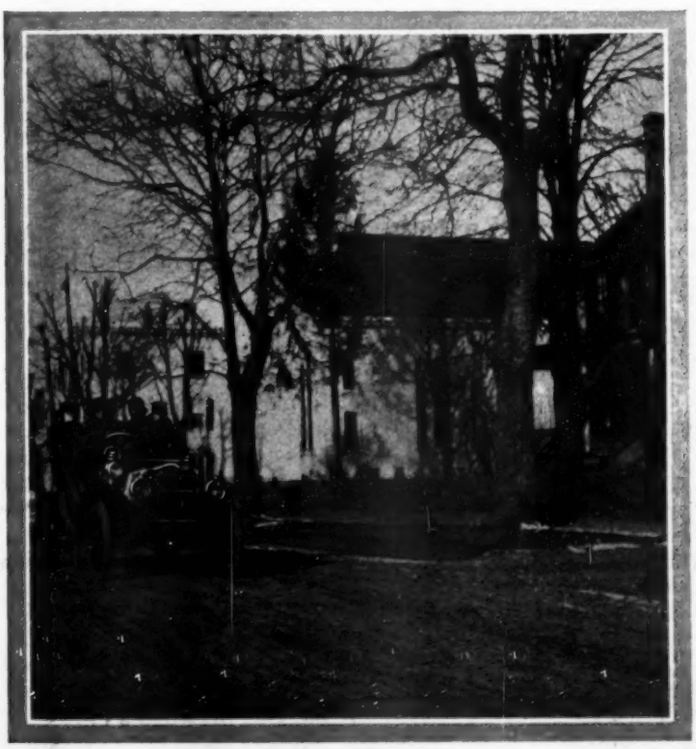
VOL. XVIII NEW YORK—THURSDAY, FEBRUARY 27, 1908—CHICAGO No. 9

THE AUTOMOBILE

LONG ISLANDERS HAVE CONVINCING ECONOMY RUN

OUT of twenty-three automobiles participating Tuesday, February 25, nineteen finished the Mid-winter Economy Run of the Long Island Automobile Club, from Brooklyn to Amagansett Bay and return, distance 234 miles, in the time limit of eighteen hours. Of the four failing to come up to the reliability standard, one, the Lozier, driven by David Mahaney, was wrecked as the result of skidding on a blind turn. Three only were eliminated by mechanical trouble. Considering the condition of the roads, the reliability of the contestants was excellent, many of the cars finishing five to seven hours before the time limit after a run unmarked by much incident.

Which of the nineteen is the best car remains to be determined. Reliability is only a qualifying condition. The winner, on the club's basis of selection, is the car having carried its load at the lowest cost per head for fuel and oil. To determine this the contents of the tanks must be measured with care. It is not a difficult operation, but is one that should be carried out conscientiously, and the club officials preferred Wednesday to delay the announcement rather than risk any mistake in their calculations.



MAXWELL PASSING BABYLON, FIRST CHECK ON LONG ISLAND RUN.

Competition for the three trophies will be keen. Certain of the drivers declare they have covered the 234 miles on eight gallons of gasoline and less than a quart of oil. The cost by railroad from Brooklyn to Amagansett Bay and return is $5.28 on an ordinary ticket and $4.20 with a mileage ticket. Taking the consumption of the most economical cars at ten gallons of gasoline and two quarts of oil—the probabilities are that it will be lower—the total fuel cost for transporting five passengers a distance of 234 miles works out at $3, or 60 cents per head.

At 6 o'clock Starter Wagner sent away the first of 23 competitors, a single-cylinder Cadillac piloted by Joseph D. Rourk. A few minutes later Claud Hosley drove a 20-horsepower Maxwell over the line, and at odd intervals the remainder of the competitors followed, the last to leave being a six-cylinder Winton. They were a representative lot of American cars, comprising such makes as Pope-Hartford, Hol-Tan, Lozier, Franklin, Haynes, Acme, Cadillac, Pullman, Mora, Studebaker, Rambler, American Mors, Maxwell, Frayer-Miller, Winton, Stevens-Duryea, Thomas Detroit, and Buick.

Land's End to Land's End, the extremities being Brooklyn and Montauk Point, had been the original route. On measuring up the distance, however, it was found that 234 miles would be covered if the cars stopped short at Amagansett Bay, and in the interests of all it was decided to cut off the run to the end of the narrow strip of land with Montauk Point as its appendix.

The previous evening every car entered for the run had been given a measured supply of gasoline and lubricating oil, verified by an observer from a rival car, supplied with a set of cards on which were to be recorded its passage at the outward checking stations, starting and finishing time, and fuel and oil used. Therefore, when the start was given, all that the driver had to concern himself about was reaching Amagansett Bay and returning to the clubhouse that evening by 9 o'clock with the least amount of consumption of gasoline and lubricating oil. The winner would be the car having taken its passengers over the 234 miles with the least cost per passenger, fuel and lubricating oil at 25 cents and $1 per gallon alone being taken into account in making awards.

Looked at critically, there is some reason for objection to the basis on which the awards were made, for every type of car had to operate under the one general rule, and though each carried its full quota of passengers according to cata-

PHOTOGRAPHING EARLY START WAS MOST DIFFICULT.

logue specifications, there was a great amount of variety. Thus the little single-cylinder Cadillac, the lowest-powered car in the test, had four persons on board; a big six-cylinder Acme, with more than four times the horsepower of the one-lunger, being fitted with a runabout body, also carried but four people. A small Buick, with open touring body, carried five people; an elegant American Mors with limousine body and windshield also had to divide its fuel and gasoline cost by five. With an icy breeze blowing across the unprotected island, there was no doubt as to which car offered the better method of travel; it was equally certain which, under ordinary conditions of operation, would have the heavier costs account.

Though recognizing that there were inequalities in the system on which awards were based, the committee believed that the wintry weather would tend to even up chances. With a heavy layer of snow on the ground and some rough going at the eastern end of the island, there were likely to be some cases of elimination from mechanical difficulties, and the heavily loaded, powerful cars were likely to see their gasoline supply diminish at an unusually rapid rate. As an object lesson on reliability and a demonstration of the cost of automobiling under ordinary winter conditions the run was of the highest value. The thoroughly earnest and businesslike manner in which every detail was attended to by the club officials served to enhance that value.

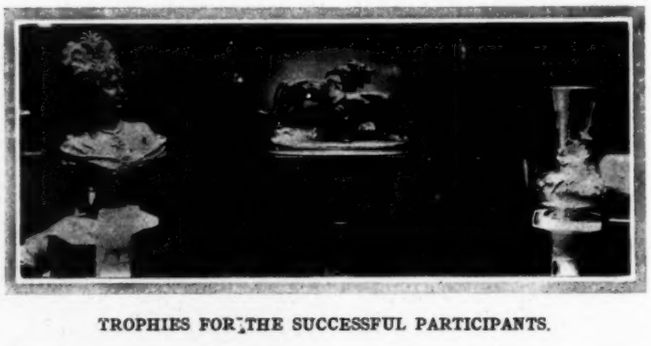
With but one or two exceptions every car taking part in the run was identical with those sold daily to the public or used by owners for ordinary touring. Though economy was the criterium, few thought it necessary to make any changes on their carbureters or to add the auxiliary air inlet which usually plays such an important part in limited fuel tests. A box on the running board for lubricating cams, and one more spare tire than is usually carried was the extent of the change on the majority of the cars. Hugo C. Gibson, the English expert for the Selden interests, was the object of numerous questions concerning a modified radiator surmounted by an ordinary house radiator escape cock, and a gasoline gauge projecting through the bonnet of the car.

CHECKING AT BABYLON—FRANKLIN IN FOREGROUND.

On the outward run to Amagansett Bay each car had to report to the four checking stations; but when the easterly point had been reached the run home could be undertaken over any road the driver preferred. Instead of the usual type of checking card to be signed in a space provided, each card had a combination set of figures on which any hour and minutes could be punched. The same system was adopted on the gasoline and fuel cards. Time spent on the road and between checking stations in no way entered into the consideration for awards, the only time provision being a return to the clubhouse at 9 P. M., no cars being checked in before that hour, and no account taken of arrivals after midnight.

What Occurred on the 234-Mile Journey.

Road conditions were such as to make the test of real value in proving the economy or otherwise of an automobile. While slightly worse than the average likely to be met with in a year's touring through the Eastern States, conditions were not so bad as to rob the run of value as an economy demonstration. On the outward trip the surface was generally hard and rutty, with but a small amount of snow.



TROPHIES FOR THE SUCCESSFUL PARTICIPANTS.

When the homeward run was commenced the thaw had softened the surface so much that there was a considerable amount of lost traction and drivers had not always an easy task in keeping their cars on the road.

The greasy surface was partly responsible for the only serious accident of the day. After checking in at Southampton, No. 20 Lozier, driven by David Mahaney, unexpectedly found an express wagon blocking the road on a blind curve. To avoid a collision the automobile driver swerved suddenly, ran on the sidewalk, crashed into a telegraph pole, smashed both left wheels and bent the front axle. The passengers suffered nothing worse than a shaking. Mahaney telephoned to New York for wheels, but was unable to finish within the time limit.

Before noon No. 5 Haynes, driven by W. E. Shuttleworth, retired from the contest with a broken rear axle. Hugo Gibson's Buick dropped out of the competition as the result of the collapse of the patent wheels which the owner was experimenting. An effort to obtain a perfect set from New York was not successful. The Hol-Tan runabout, driven by Neilson, developed differential troubles on the outward run, was reported to be in further difficulties on the way home, and had not appeared at the garage at the closing hour, Tuesday midnight. For a time it appeared as if the little single-cylinder Cadillac would be eliminated, a broken wheel having caused it to lose a considerable amount of time. At 10:30, however, it reported at the clubhouse, and was consequently entitled to enter with the others for the economy classification.

Ideas differed on the method of driving in an economy competition. Half a dozen rushed over the course at such a speed that they were back in Brooklyn at 4 o'clock. Three cars, a six-cylinder Acme, a Thomas-Detroit, and a Stevens-Duryea, had entered the garage before 5 o'clock. C. S. Arnold's Pope-Hartford, a Lozier, Pullman, two Acme cars and a Mora had finished the run shortly after 6 o'clock. The early finish benefited them nothing, no official recognition of arrival being made before 9 o'clock.

Among those who believed that slower travel would reap its reward in the final classification were the drivers of the Frayer-Miller and the Franklin, the only air-cooled candidates. It was almost 9 o'clock when the couple entered the garage together and set circulating stories of the journey having been covered on less than eight gallons of gasoline. The two small Maxwells followed the same slow and sure policy. The American Mors, a big, comfortable-looking limousine, which had carried its load of five in luxury and without a hitch, was one of the few high-powered cars to arrive after 9 o'clock. H. A. Martin accepted a heavy handicap when he undertook to drive a limousine in competition with light touring cars, but he certainly gave his passengers the most enjoyable trip of the day.

The first prize is a handsome imported bronze of an Indian girl on a marble pedestal, valued at $200. Second prize consists of a well executed bronze of a lion and a lioness, valued at $100, and the third prize, a sterling vase with heavy floral decorations, its value being $50. About 60 per cent. of the entry fees were expended by the committee in prizes, the remaining 40 per cent. being for necessary expenses attached to the organization of the run.

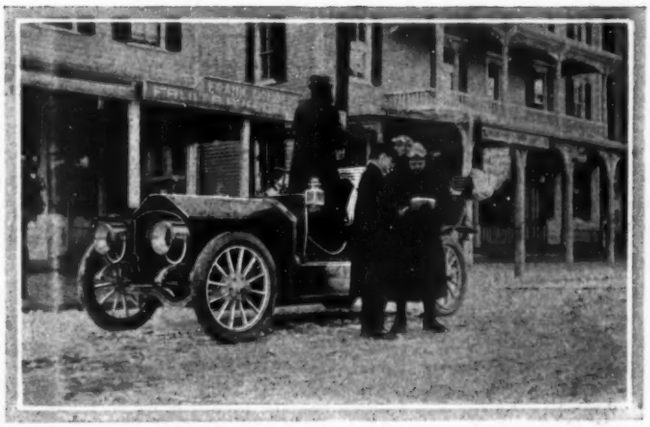
The energetic contest committee, consisting of A. R. Pardington, chairman; C. G. Arnold, F. D. Bandell and Secretary Russell A. Field, was ably assisted by the following staff of officers: Referee, Jefferson DeMont Thompson; judges, F. G. Webb, Alfred Reeves, Dr. C. B. Parker; judges of gasoline, E. L. Ferguson, L. T. Weiss, A. C. Alderman; judges of lubricant, H. L. Towle, R. H. Johnston, A. F. Camacho; judges of observers, W. R. Lee, W. C. Colson; judges of passengers, A. W. Blanchard, R. G. Howell; timers, C. J. Dieges, V. Clust; starter, Fred Wagner; checkers, L. M. Bradley, M. C. Reeves, K. S. Arnold, J. E. Goey.

Particulars of the Twenty-three Competitors.

No.	Car.	H.P.	Entrant.	Driver.	Seats.	Wt.
1.	Pope-Hartford	30	A. G. Southworth	Phil Haynes	5	2500
2.	Hol-Tan	25	Hol-Tan Co.	V. A. Neilsen	4	2400
3.	Lozier	45	H. D. Lozier	H. Michener	7	3400
4.	Franklin	16	Franklin Auto Co.	H. A. Vail	4	1600
5.	Haynes	30	W. E. Shuttleworth	Shuttleworth	4	2250
6.	Acme	45	J. W. Mears	J. W. Mears	7	3600
7.	Acme	45	J. W. Mears	Flinn	3	3200
8.	Acme	35	J. W. Mears	Walton	4	3300
9.	Cadillac	10	J. D. Rourk	J. D. Rourk	4	1650
10.	Pullman	20	F. Cimiotti	R. Morton	5	1900
11.	Mora	24	Mora Co.	W. Birdsall	3	2000
12.	Studebaker	30	Studebaker Co.	J. Holm	5	2550
14.	Pope-Hartford	30	J. W. Sutton	C. G. Arnold	5	2750
15.	Rambler	32	Homan & Schulz	D. C. Teetor	5	2600
16.	Am. Mors	40	St. Louis Co.	H. A. Martin	5	3100
17.	Maxwell	24	I. C. Kirkham	I. C. Kirkham	5	2100
18.	Maxwell	20	I. C. Kirkham	C. Hosley	5	1600
19.	Frayer-Miller	24	H. H. Knepper	H. H. Knepper	5	2200
20.	Lozier	45	D. Mahaney	D. Mahaney	7	3400
21.	Winton	50	C. A. Carlson	C. A. Carlson	7	3700
22.	Thomas Detroit	40	Brun Auto Co.	W. H. Bowers	5	2600
23.	Stevens-Duryea	35	K. Swan	K. Swan	5	2600
24.	Buick	22	Hugo C. Gibson	Hugo C. Gibson	5	1600

RENAULT TAXICAB SERVICE IN NEW YORK.

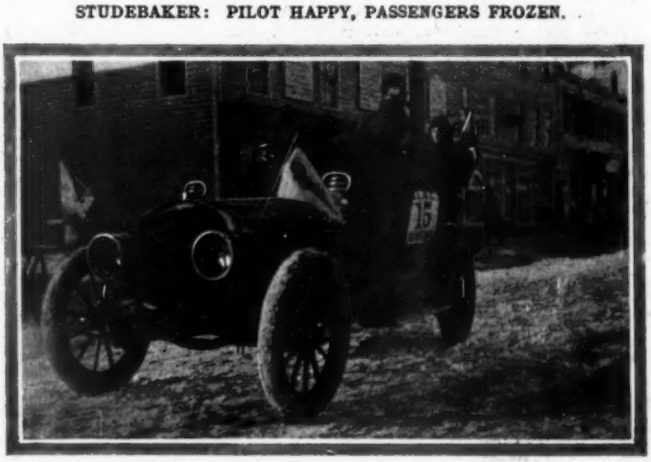
Paul Lacroix, general manager Renault Freres Selling Branch, New York City, announces that about March 10 he will take possession of the new six-story building, Nos. 214-216 West Sixty-fifth street, especially built for the sole use of the Renault garage, spare parts, and repair shops, and Renault taxicab department. The garage will be for the use of Renault owners exclusively. Mr. Lacroix states that it will be as complete in every detail as any of the Renault Paris garages and will be conducted on similar lines with the French workmen. New York is soon to have a Renault taxicab service.



ACME SCORES FOR FIRST LEG OF JOURNEY.

MORA REACHES THE LINE ON TIME.

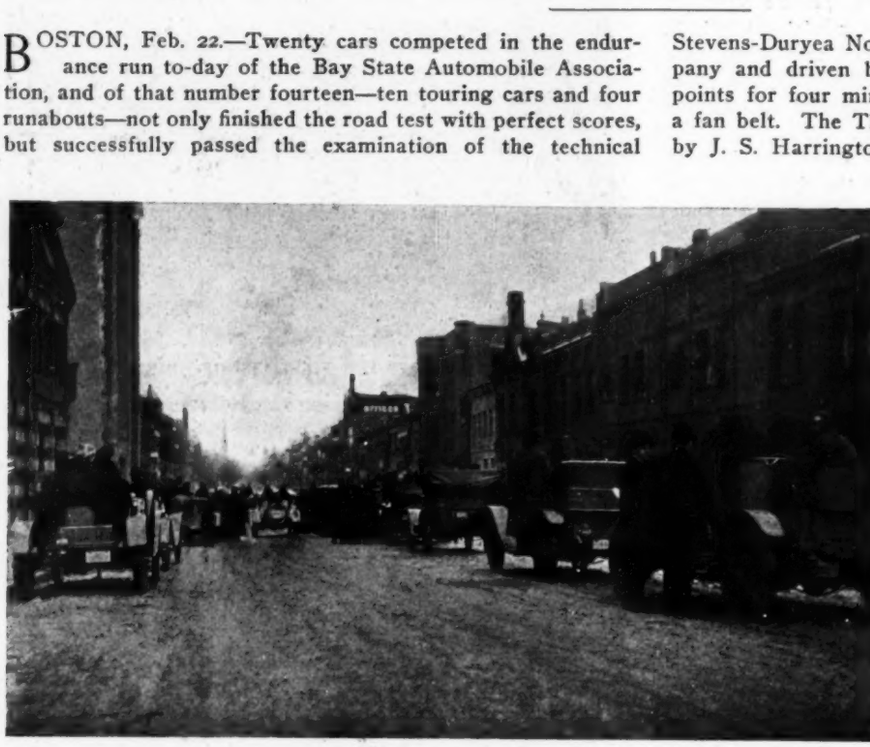
STUDEBAKER: PILOT HAPPY, PASSENGERS FROZEN.



RAMBLER OCCUPANTS WEATHER-FORTIFIED.

MANY PERFECT SCORES IN BAY STATE RUN

BOSTON, Feb. 22.—Twenty cars competed in the endurance run to-day of the Bay State Automobile Association, and of that number fourteen—ten touring cars and four runabouts—not only finished the road test with perfect scores, but successfully passed the examination of the technical committee without having any black marks scored against them. The perfect score cars were as follows:



IT WAS EARLY IN THE MORN WHEN THE CARS STARTED FROM BOSTON.

No. 1—Marmon, entered by F. E. Wing, driven by F. E. Wing.

No. 2—Thomas-Detroit, entered by the Whitten-Gilmore Co., driven by Charles E. Whitten.

No. 5—Studebaker, entered by Studebaker Automobile Co., Boston branch, driven by Walter Jones.

No. 6—Atlas*, entered by Harry Fosdick Co., driven by W. E. Ruggles.

No. 7—Knox, entered by Reed-Underhill Co., driven by William Bourque.

No. 10.—White, entered by the White Co., driven by H. K. Sheridan.

No. 11—White, entered by The White Co., driven by Walter White.

No. 12—Thomas Flyer, entered by J. S. Harrington, driven by A. H. Dorsey.

No. 13—Reo*, entered by Linscott Motor Co., driven by F. H. Pratt.

No. 14—Austin*, entered by I. N. Litchfield, driven by J. C. Kennedy.

No. 16—Lozier, entered by H. C. & C. D. Castle, driven by Harry Michner.

No. 17—Oldsmobile, entered by Algonquin Motor Car Co., driven by J. H. Hobson.

No. 19—Rambler*, entered by V. A. Charles, manager for Thos. B. Jeffery & Co., driven by E. W. Williams.

No. 20—Franklin, entered by Franklin Automobile Co., driven by Theodore Young.

Of the six cars which failed to make perfect scores, three finished with penalties and three dropped out. Of those which finished, the Rambler touring car No. 18, entered by V. A. Charles and driven by him, was penalized four points for two minutes delay in adjusting a needle valve. The Stevens-Duryea No. 15, entered by the J. W. Bowman Company and driven by J. W. Robinson, was penalized eight points for four minutes spent near Providence in adjusting a fan belt. The Thomas Detroit, No. 3, entered and driven by J. S. Harrington, was penalized five points for stalling the motor at the start of the last stretch of the run. The Springfield, No. 4, entered by the Harry Fosdick Co. and driven by L. D. Robbins, had trouble with the steering gear, but was repaired and was able to return to Boston under its own power. The Knox, No. 8, entered by the Knox Automobile Company and driven by A. E. Dennison, was obliged to discontinue because of trouble with the rear axle, while the Winton, No. 9, entered by the Winton branch and driven by L. B. Harris, was delayed by a gasoline feed pipe which caused bother.

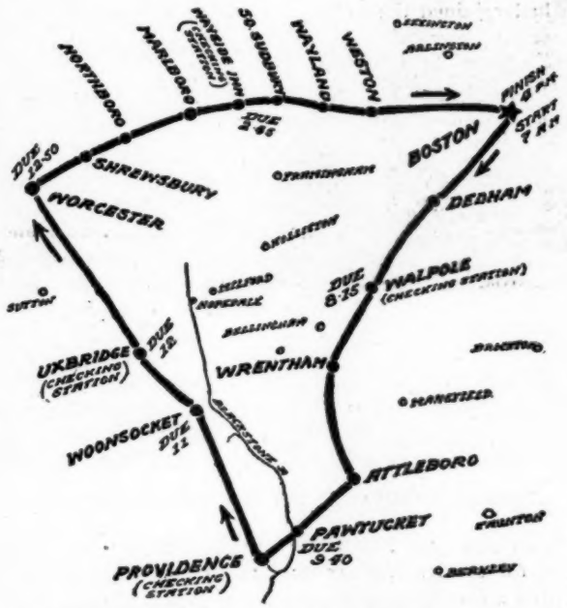
The weather and road conditions, considering the time of year, were excellent. Overhead the sun shone brightly all day long and there was just enough bite in the air to make a fur coat feel comfortable and not enough chill to prevent the observers and other passengers thoroughly enjoying the trip of about 135 miles from Boston to Providence, Providence to Worcester and Worcester to Boston. The snow and ice left by the storm earlier in the week had made the highways rather rough, but they were much better than many of the drivers anticipated, and the rough ice was better than the soft snow and mud that prevailed earlier in the week. The contest committee, expecting bad road conditions, had made a slow schedule, but once the run was started it was found that the cars were having so easy time in keeping their schedules that the runs between controls beyond Providence were shortened considerably.

AND IT WAS DUSK OF EVENING WHEN THEY WERE CHECKED IN.

*Runabout.

The lot of cars which left the clubhouse of the Bay State Automobile Association at one minute intervals after 7:01 A. M. was a most representative assortment, and the fact that fourteen successfully completed the run in good condition speaks much for the advance that has been made by the industry. A year or two ago the fact that a car was able to cover the triangle at all, to say nothing of keeping on a schedule and being subjected to a trying examination by a committee of technical experts, would have been recommendation enough. The entries represented almost every shade of opinion among automobile designers and manufacturers. Among them were air-cooled and water-cooled cars, two, four and six-cylinders, tourers and runabouts, two and four-cycle motors, vertical and V motors, small, medium and high-priced vehicles. And nearly every variety was represented among the perfect score machines, a fact which is commendatory to the American industry as a whole.

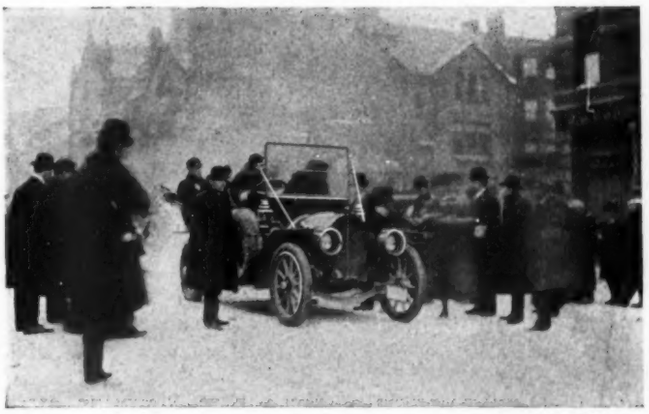
The drivers, too, represented varying shades of experience. There were Walter White and Hal Sheridan, veterans of many a tour and endurance run, one of them the winner of the Hower trophy in last year's A. A. A. tour.; F. E. Wing, who drove a Marmon air-cooled car with a perfect



ROUTE OF THE BOSTON 135-MILE ENDURANCE RUN.

score in the Glidden tour in 1906; Fred Pratt, whose performance with the little Reo won him praise from his competitors equipped with much larger and more powerful machines; A. H. Dorsey, whose Thomas Flyer was the same that recently made the snow ploughing trip from Buffalo to Boston; and others of much less experience, who nevertheless handled their cars with equal skill. Every driver made each of the controls on time, the penalties being inflicted by observers.

The last car was sent away at 7:21 A. M. Ahead of the contestants Arthur Knights with his Oldsmobile scattered a trail of confetti and J. W. Maguire, with a six-cylinder Pierce Great Arrow, carried out the checkers. Behind the contestants Henry S. Johnson with a six-cylinder Premier, Manager Kilbourne with a six-cylinder Franklin, and A. E. Morrison's Wayne took care of the officials and newspaper men and picked up the checkers as soon as all the cars had passed their stations. The committee, consisting of John C. Kerrison, chairman; Ernest A. Gilmore, of the Whitten-Gilmore Company; Alfred N. Robbins, of the Harry Fosdick Company, and Col. Horace G. Kemp, did excellent work in preparing for the run and carrying it through, and the success



ONE PERFORMER WAS A "BIG SIX" THOMAS.

of the contest is in large part due to its efforts, as well as to the high quality of the cars entered and the skill of the drivers.

There were five controls in the course of the run. The first was at Walpole on the way to Providence, and the second in the city of Providence. A stop of forty minutes was allowed in Providence, and the Rhode Island Automobile Club extended every possible hospitality to the contestants and those who accompanied them. Between Providence and Worcester the first control was at Uxbridge, and the second at Worcester, and there the Worcester Automobile Club kept open house for the visitors during the short stop for luncheon. An unusual incident happened in Worcester and Arthur Knights, the confetti carrier, came near getting into trouble with the United States postal authorities. While he was passing through the city Postmaster Hunt noticed that the bags from which the confetti was being thrown were United States mail bags. He stopped Mr. Knights and warned him that he was committing an offense against the Federal laws in using mail bags for that purpose. Mr. Knights explained that the bags were given him by the party that provided the confetti. Postmaster Hunt advised him to leave the bags in Worcester, which he did, transferring the confetti to some potato sacks.

The only control between Worcester and Boston was at Wayside Inn, and from there the roads to Boston were excellent, and Mr. Wing with the leading car checked in exactly on time at 4 o'clock in the afternoon. As rapidly as the cars arrived they were taken into the White garage on Newbury street and placed at the disposal of the technical committee. Pending the report of the committee the competitors and the passengers, with the exception of Mrs. J. S. Harrington and Mrs. E. M. Dodge, the only women to make the run, awaited the final returns at the Bay State clubhouse.

WALTER WHITE CHECKING IN AT PROVIDENCE.

BAY STATERS: ROBBINS, KEMP, KERRISON, AND GILMORE.

It was 9:30 o'clock in the evening when the technical committee made its report. It stated that after carefully examining all the cars it had been unable to find any cause for changing the results as shown by the road test. This was a most satisfactory finish for the contest, and, as a majority of the drivers and entrants of the perfect score cars opposed an attempt to run off the tie, it was decided not to hold another contest to break the tie and to award certificates to all the cars which had made perfect scores.

DETROIT AGAIN HEARS MACHINERY'S MUSIC.

DETROIT, Feb. 24.—There is music in the air, and it is not the distressing strains of a dirge either, so far as local automobile manufacturers are concerned. On every hand there are evidences of activity in anticipation of what the coming season will bring forth. A portion of this optimism is based on results at the show just closed, but makers are banking largely on conditions as revealed by a careful canvass of the trade in general.

Two months ago scarcely a wheel was turning in the local automobile factories. This was not wholly unexpected, for the early winter months are always quiet.

YORK COMPANY ENTERTAINS PRESS MEN.

YORK, PA., Feb. 26.—The York Motor Car Company, manufacturers of the Pullman automobile, entertained the sporting writers and automobile editors of the Philadelphia, Harrisburg and York newspapers at a banquet last night. Every newspaper in these cities was represented, and L. E. French, the Philadelphia agent for the company, acted as toastmaster. The owners of the plant were in attendance and responded to toasts, as did several of the "pencil pushers."

CHECKING IN THE BUNCH OF CARS AT PROVIDENCE.

NEW YORK-PARIS MEN FIGHTING WITH SNOW.

That endurance run to Paris, which everybody persists in calling a race, has descended to such a low rate of travel that whatever element of speed there may have been in it at the commencement has now been removed. When Montague Roberts, who has throughout maintained the lead on the Thomas car, reached Toledo at the end of the seventh day, it was supposed that he would be in Chicago 48 hours later. He made a splendid exhibition on the run to Kendalville in the face of a snowstorm, but since then has had a terrible struggle with Indiana snowdrifts. After four successive days in which the mileage was 17, 42, 24 and 11, Roberts hitched his car onto the Lake Shore tracks and ran into Chicago under his own power, arriving at the automobile clubhouse at 4:25 P. M. on Tuesday, February 25, having covered the first 1,043 miles in 13 days, 6 hours and 10 minutes. On Thursday he will leave for Ogden.

The De Dion, as the result of a broken driving shaft, fell behind the American car on the eighth day of the run and had not been able to make up the difference on the thirteenth day. For a time the Italian Zust was second in the trail, but by the time North Carlisle, Indiana, was reached the Frenchman had rejoined the Italian and was but five miles behind

THOMAS SURMOUNTING THE INDIANA SNOWDRIFTS.

the American. So heavy are the snowdrifts that a track cleared for the leading car is of no assistance to the others following a few hours later, every team being obliged to work constantly with shovels, horses and plows to clear a track through the deep snow. The slower German Protos and French Motobloc have closed up somewhat on the leaders, but unless weather conditions change quickly will again lose their advantage in the deep snowdrifts of Indiana. The mileage of the five cars from the seventh to the thirteenth day, inclusive, is as follows:

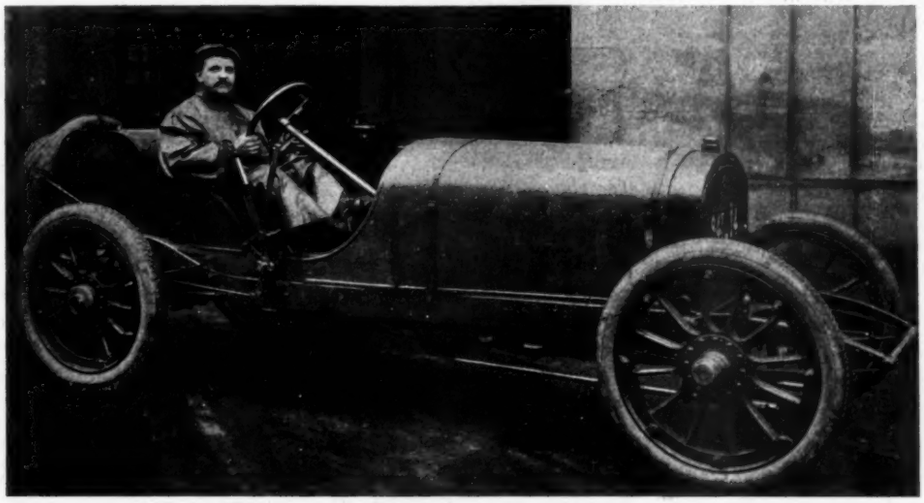
Car. Nation.	6th day	7th day	8th day	9th day	10th day	11th day	12th day	13th day
Thomas (American)..	566	785	891	904	921	963	987	988
De Dion (French)....	566	756	888	895	895	895	921	963
Zust (Italian).....	543	667	854	881	895	912	949	963
Protos (German).....	471	566	613	617	725	817	865	888
Motobloc (French)....	352	471	548	613	693	785	854	881

STUDEBAKER COURIER CAR REACHES CHICAGO.

CHICAGO, Feb. 25.—The Studebaker car carrying the war message from New York City to Fort Leavenworth reached Chicago at 4:20 P. M. to-day shortly in advance of the first New York-Paris racer. Since leaving New York the car has been handled by three shifts of drivers, working eight hours on a stretch, and the intention is to make the journey in as short a time as possible under the adverse conditions now prevailing. The car is standing the journey exceptionally well. Its equipment includes anti-skid Continental tires.

SIX NATIONS TO PARTICIPATE IN GRAND PRIX

PARIS, Feb. 15.—Thirty-seven powerful racers, carrying the colors of France, America, Germany, Italy, Belgium and England, are already officially engaged to compete in the French Grand Prix at Dieppe, July 7. Twenty-four hours remain in which further entries may be received at ordinary fees, and there is a possibility of half a dozen late comers handing over half a dozen thousand dollar fees before Secretary Sautin raises the rates. The feature of the entry list is the comparatively low French representation. Several firms more or less consistent in speed contests in the past have restrained from racing this year. Darracq, hitherto irrepressible where records were at stake, will be a mere spectator on the Dieppe course. His abstentation is declared to be due to the fact that the big factory on the banks of the Seine is now largely under British control, the directors from across the Channel not being as keen on building flyers as the man who sent Wagner over the Atlantic for the Vanderbilt Cup. It is an open secret that the withdrawal of Darracq cars from official participation in last year's races was due to British influence on the board of directors. Hotchkiss will not line up; Henri Brasier, though taking a keen interest in the race, is not certain to hand over the necessary fee allowing him to run three cars; Gobron, Mors, and C. G. V. are other large firms which will not be represented.



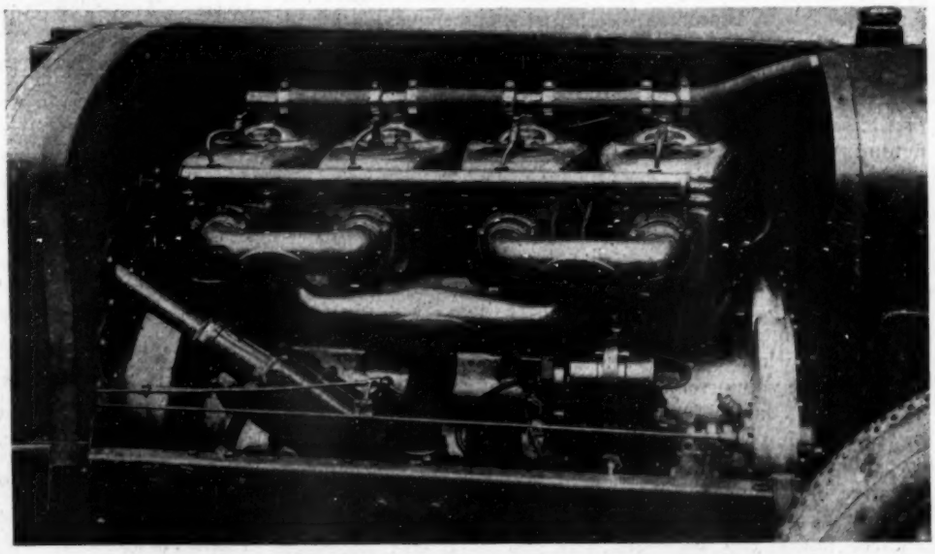
GABRIEL READY FOR ROAD TESTS ON BAYARD-CLEMENT RACER.

As the list stands at present, France has 15 cars against 22 for all other countries, individual figures being Germany 9, England 6, Italy 3, Belgium 3 and America 1. There are still hopes that S. F. Edge will come into line and increase the British representation by three Napiers. For weeks a wordy battle has been waged between the militant Englishman and the leaders of the French club on the use or non use of detachable wire wheels in the Grand Prix. Following previous practice the changing of wheels is forbidden; this so angered Edge, who has used detachable wheels exclusively in his 1907 track racing, that he accuses his neighbors of unsportsmanlike practices and refuses to race on their terms.

Ten rounds of the 77-kilometer circuit will have to be covered by the Grand Prix racers and 6 rounds by the Voiturettes. This will give a total distance of 478.4 miles for the powerful cars and 287 for the small racers. As practically all the drivers have had some experience on the course, there has not been the same wild rush to the Dieppe course that usually marks the selection of a circuit. Road tests of the actual cars to be used in the Grand Prix have already begun, the Renault team leaving for Dieppe this week and Gabriel and Rigal of the Bayard-Clément factory being already on the course. The ex-Dietrich driver has one of the 155-millimeter cars; his companion is piloting one of the fastest machines of last season, the object being to test the two side by side on the road. From the reports of the drivers the surface of the course is in excellent condition after the winter storms and will not call for much labor to put it into first-class racing trim. It is intended, however, to remake all weak spots and thoroughly retar.

As an instance of the thoroughness with which preparations are being made for the race, the Bayard firm has built two series of cars, one set with a stroke of 6.6 inches, the other with 7.2 inches stroke. Bore in each case is the maximum of 155 millimeters, all other structural features being identical. Unless the British Napier team is entered it is certain that all machines will be of the four-cylinder four-cycle type, and all with the exception of the American will have the maximum bore of 155 millimeters. As last year, the Panhard engines will probably be tried out on Monaco motor boats before being put on the racing chassis.

It would appear that no firm will take advantage of the



BAYARD-CLEMENT ENGINE PRODUCED UNDER NEW INTERNATIONAL RULE.

special opportunity to race two-cycle cars against those of the four-cycle type under the maximum bore rule. Those firms having studied the two-cycle engine seriously have failed to be moved by the offer of the Racing Board.

The full list of entries a few hours before the official closing is as follows:

Germain (Belgium), Desgrais.
Germain (Belgium), Roch-Brault.
Germain (Belgium), Perpère.
Benz (Germany), Hemery.
Benz (Germany), Hanriot.
Benz (Germany), Earl.
Fiat (Italy), Lancia.
Fiat (Italy), Nazzaro.
Fiat (Italy), Wagner.
Panhard (France), George Heath.
Panhard (France), Maurice Farman.
Panhard (France), Cissac.
Motobloc (France), Courtade.
Motobloc (France), Pierron.
Motobloc (France), Garcet.
Mercedes (Germany), Willy Poegge.
Mercedes (Germany), Salzer.
Mercedes (Germany), Lautenschlager.
Dietrich (France), Duray.
Dietrich (France), ———.
Dietrich (France), ———.
Austin (England), ———.
Austin (England), ———.
Austin (England), ———.
Renault (France), Szisz.
Renault (France), Caillois.
Renault (France), Dimitriewitch.
Bayard-Clement (France), Rigal.
Bayard-Clement (France), Gabriel.
Bayard-Clement (France), Hautvast.
Opel (Germany), Fritz Opel.
Opel (Germany), Joris.
Opel (Germany), Michel.
Weigel (England), ———.
Weigel (England), ———.
Weigel (England), ———.
Thomas (America), Montague Roberts.

Race of Little Fellows Day Before Grand Prix.

Being almost entirely confined to French cars, the Voiturette race to be run the day preceding the Grand Prix will not arouse much international enthusiasm, though home constructors are busily discussing the possibility of high speeds with the 3.9-bore single-cylinder racers. Twenty-four cars are now entered, all French with the exception of the Isotta-Fraschini team of diminutive four-cylinder racers. The Italian firm is also the only one to build four-cylinder cars under the Voiturette limited bore rule. A few of the French firms may put in two-cylinder cars, and one house at least will enter a two-cycle engine, but the large majority will present four-cycle, single-cylinder engines of 3.9 inches bore.

TAXICAB, ALCOHOL AND ENGINE TESTS.

PARIS, Feb. 17.—Taxicabs, motors running on alcohol, and high-powered engines are each to be provided by a public competition through the efforts of the Automobile Club of France. The taxicab event, to form a part of the industrial vehicle competition of the A. C. F. in May, will provide for engines of 3.9 bore for a single cylinder and a four-cylinder of 3.1 inches bore. Maximum weight, with passengers on board and tanks filled, is fixed at 2,200 pounds for the smaller cars, the proportion to increase with cylinder area. Maximum and minimum speeds are to be 9 and 18 miles an hour. After a preliminary endurance test the survivors will be classified on a ton-mile fuel consumption basis, denatured alcohol to be used exclusively.

In connection with the Anti-Alcoholic League, the A. C. F. technical committee will hold a power and consumption test for all types of motors using denatured alcohol. The competing engines must undergo a six-hours' test under full load, three hours under half load, and three hours running free. Lowest consumption and highest power developed will determine the winner. The teetotal league gives a $400 prize and a private supporter another of $1,000.

The third competition is for internal combustion engines of any type, horsepower to be not less than 24 nor more than 80. Weight of the engines must not exceed 8.8 pounds per effective horsepower, all accessories connected with the motor to be included. The average power developed under a three hours' test with full load will determine the winners. Engines must be run light 15 minutes before load test.

MOUNTAIN SPEED TRACK FOR FRENCH CLUB.

PARIS, Feb. 17.—A permanent course to be used for all races and touring contests in France has again been brought up for discussion by the departure of a delegate of the Automobile Club of France to study a track in mountainous Auvergne. As at present proposed, the scheme provides for the cutting of two parallel roads around the steep slopes of the Puy-du-Dome, over a part of which the Gordon Bennett race was run in 1905. The two ring roads, united at one point, give a total distance of 24 miles along the flank of the mountain. All the land in the neighborhood of the course is of a volcanic origin unsuited for cultivation. There are no cross roads whatever, and although a local railroad crosses the proposed course it will in no way interfere with the speed track, for the rails will be carried either over or under the road.

It is proposed to construct a double track of a total width of 78 feet, divided in the middle by a low barrier and fitted with central electric lamps at distances of 100 yards. Each track will be curved, have a gutter for carrying away the water at the inside and the outside and be protected by a high banking and a fence four feet in height. Grandstands erected within the course will be reached by the track railroad. It is estimated that the total cost of constructing the course will be $400,000. This sum will include the electric lighting station, power for which will be obtained from a mountain stream. The land being of very low value, it is not supposed that there will be any difficulty in obtaining a right of wary. Clermont-Ferrand, but eight miles distant, is the home of Michelin and other important tire manufacturers.

ECONOMIC SUGGESTIONS FOR PARIS SALON.

PARIS, Feb. 17.—If the Federation of Cycle and Automobile Manufacturers, of which M. Darracq is president, could have its way, there would be no Paris Salon this year, that body considering an exhibition every two years quite sufficient for the industry. As the Federation is only one of three bodies responsible for the holding of the show, and is in a minority on the period question, it will content itself with suggesting economic reforms. The Salon, it declares, should not continue more than ten or twelve days; the competition for decoration of stands should be abolished; fifty per cent. of the net profits should be distributed among the exhibitors in proportion to the amount paid for space; there should be no increase in the price for space. Finally, the date they consider most suitable for the show is the first fortnight in December. There is a consensus of opinion that a good show can be held without lavish expenditure of money.

ZEPPELIN AIRSHIP TO BE BOUGHT BY GERMANY.

BERLIN, Feb. 10.—At the recent meeting of the Budget Commission of the Imperial Diet, it was resolved to grant the demanded sum of 400,000 marks for aerial motor tests and to acquire the airships built by Count Zeppelin for the sum of 2,150,000 marks. Aerial motorism has found a great supporter in the German nation, as all parties were at one on the point of the desirability of furthering its progress to the utmost.

The Swiss Aero Club has resolved to enter two balloons for this year's Gordon Bennett of the air.

VICHY OFFERS $4,000 FOR AERO PRIZES.

PARIS, Feb. 17.—Four thousand dollars are promised as cash prizes for an aeroplane competition that the Aero Club of France will organize at Vichy next September. The tests will be held, in all probability, on the Vichy racecourse. To cover the expense of transporting the flying machines to Vichy an allowance of $200 will be made to every person taking part in the contest. Entries close July 15.

PROBLEMS IN THE REPAIRING OF AUTOMOBILES*

By THOS. J. FAY, E.E., Pres. Society of Automobile Engineers.

THUS far, the vanadium chrome steel exposed to view presented a very nearly even chemical composition; that the composition is usually readily distinguishable without difficulty in the micro-photograph, will be seen by an inspection of the micro-photograph, Fig. 8, the data of which is as follows:

Magnification	350
Etching	Deep
Condition	Normal
Metalloids	Low
Carbon	16 points
Vanadium	0.16%
Chromium	0.30%
Process	Basic
Structure	Characteristic

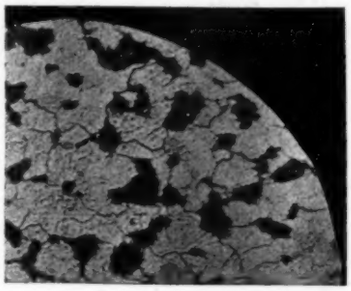


FIG. 8.

As will be observed, this specimen is one of very low chromium, and with a decreased vanadium content, with the further characteristic of low carbon. This is obviously a "cementing" (case-hardening) fabric. The effect of cementing on the product such as this will be found in Fig. 9 (core of the cemented section), the data of which is as follows:

Magnifications	350
Etching	Deep
Condition	Cemented
Metalloids	Low
Carbon	16 points
Vanadium	0.12%
Chromium	0.30%
Process	Basic
Structure	Coarse

It might be well to show, by comparison, in so far as it will be possible to do so, the influence of these small increments of vanadium and chromium on the micro-structure, using for the comparison a micro-photograph of acid open-hearth steel. Fig. 10, which is an excellent example of the material in question, is offered with that end in view, the data of which is as follows:

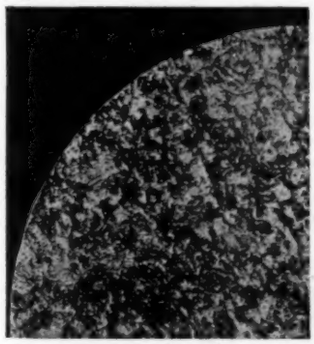


FIG. 9.

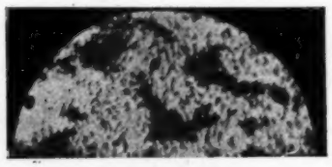


FIG. 10

Magnifications	350
Etching	Deep
Condition	Annealed at 800° C.
Metalloids	Low
Carbon	25 points
Process	Acid Open Hearth
Structure	Characteristic

It would be possible to give many illustrations of the effect of vanadium in conjunction with chromium on steel, and to comment at some length upon the service to be expected. The scope of this article does not demand further effort in this direction, and it will be well to give to chrome nickel steel its measure of attention. That the chrome nickel steel looks better in the micro-photographs is to be expected, since the same steel tests better in practice. The extent of the improvement depending upon the care and the process in the fabrication of the steel. This is provided the ores used are of the desirable grades.

*Continued from page 243, The Automobile, issue of February 20.

The first of these grades of steel to be taken up here will be one from a *special heat,* at the instance of the author, in which Wolfram was substituted for nickel. This steel is of excellent qualities, and the micro-photographs will show a considerably settled uniformity for this and the specimens (this is Fig. 11). Figs. 12, 13 and 14, each of them taken at high magnifications. The data of the chrome Wolfram steel, Fig. 11, is as follows: (Work done by Robert W. Hunt & Company.)

Magnification	1200 diam.
Objective	½"
Eye-piece	1"
Exposure	½ min.
Plate	Cramer contrast
Light	Electric Arc
Development	Ferrous oxalate
Etching	40 sec.
Etching solution	10%, HNO_3 in absolute alcohol

Iris diapraghm on microscope stopped down two-thirds.

CHEMICAL COMPOSITION

Chromium	1.44%	Silicon	0.0197%
Nickel	None	Sulphur	0.033%
Wolfram	0.952%	Phosphorus	0.011%
Carbon	0.318%	Manganese	0.29%

FIG. 11.

The micro-photographs, Figs. 12, 13 and 14, were made in substantially the same way, in the same laboratory; hence it will not be necessary to repeat all the details in the discussion thereof. Fig. 12 is of Krupp chrome nickel steel, the regular brand E. F. 60-0, the data of which is as follows:

Magnifications	1,200 diam.
Etching	50 sec. (light)
Condition	Normal
Metalloids	Low
Carbon	25 points
Chromium	1.69%
Nickel	4.40%
Process	Acid
Structure	Not defined

Fig. 13 is of "Bischoff" chrome nickel steel (soft), the data of which is as follows:

FIG. 12.

Magnifications	1,200 diam.
Etching	45 sec.
Condition	Normal
Metalloids	Low
Carbon	26 points
Chromium	1.10%
Nickel	3.69%
Process	Crucible
Structure	Not defined

Fig. 14 is of a fine American brand of chrome nickel steel, "Midvale," the data of which is as follows:

Magnifications	1,200 diam.
Etching	30 sec.
Condition	Normal
Metalloids	Low
Carbon	30 points
Chromium	1.23%
Nickel	3.60%
Process	Midvale
Structure	Not defined

FIG. 13.

Here we have, then, three standard grades of chrome nickel steel, all treated in the same way in the same laboratory, with the same skill, magnified to the same extent, and they look so much alike as to render the difference not apparent to the unskilled eye, to say the least. This is due primarily to the fact that the several products are very much alike, and again to the high magnification. With a view to showing that the detail can be brought out, Fig. 15, of Bischoff chrome nickel steel, is offered, the data being as follows for this case:

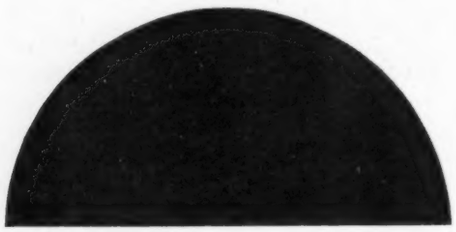


FIG. 14.

Magnifications	350 diam.
Etching	Medium
Condition	Cemented
Metalloids	Low
Carbon, Chromium and Nickel	Same as Fig. 13
Process	Crucible
Structure	Clearly defined

This micro-photograph clearly shows the depth of the hard *"case,"* the soft *"core,"* and the *intervening strata.* This is ample evidence of the fact that it is not desirable to go to high magnifications at all. This specimen is also indicative of definite data of the depth to which the hard case can be made to penetrate, if the cementing process is skillfully conducted.

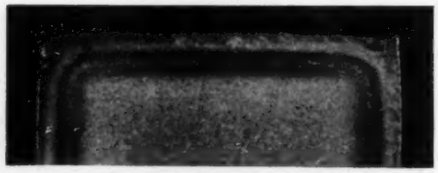


FIG. 15.

Let us go into this matter at some further length, however, that we may know just what is the nature of the "shell" and the "sap" (core). To do this is to examine the micro-photographs of the same (each of them) in detail. For the "shell," Fig. 16 is here given, the data of which is as follows:

Magnifications	350 diam.
Etching	Medium
Condition	Shell (hard)
Metalloids	Low
Carbon, Chromium and Nickel	Same as Fig. 13
Process	Crucible
Structure	Well defined

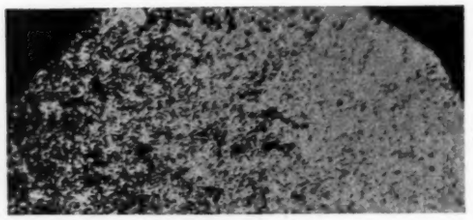


FIG. 16.

For the "core," as depicted, Fig. 17, the data is as follows:

Magnifications	350
Etching	Medium
Condition	Core (soft)
Metalloids	Low
Carbon, Chromium and Nickel	Same as Fig. 13
Process	Crucible
Structure	Well defined

Fig. 18 is given to show the great difference as between magnifications of a small number of diameters, and the results of high magnifications; the Fig. 18 shows a fracture of a specimen of nickel steel at 20 diameters. It is obvious that if the micro-photographs can be distinguished from each other, the difference will be apparent to the observer through a microscope, or even if a magnifying glass is used of a power of 20 diameters.

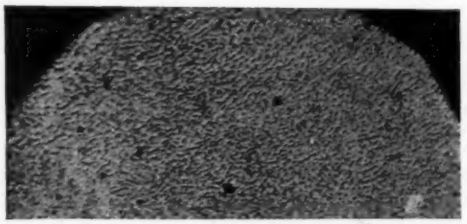


FIG. 17.

That a repair man should be able to tell the genera of steel in a part is fairly certain; but should he fail to come that close, he can at least note if the structure is open or close, and the fracture can be inspected to observe if the same is *crystalline* or of a *silky* nature.

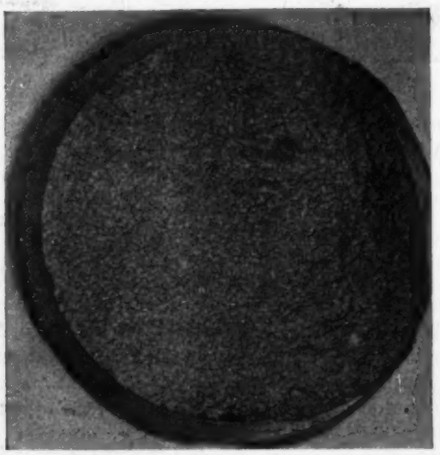


FIG. 18.

A little skill helps out wonderfully, and skill is but the prod-

uct of *oft-repeated attempts.* There are none with a monopoly of brains, though steel mongers are wont to have us think so.

At all events, it must be true that the quality of the material in the part to be *replaced* should be *inferior,* if anything, to the quality of the material of the replacement. This can only happen if the process of arriving at the conclusion is thorough.

Some Further Considerations in Conclusion.

In working up material for use in parts there are diverse ways of fashioning the parts, but it can be said the end will always be the same. In other words, the strength of the material may be adequate, but in the process the methods may be adverse.

Take, for illustration, the matter of crankshafts; if they are slabbed out, the result may be about the same as if a plank of wood were worked in the same way. The grain will lay so as to render the strength dependent upon the relation of the grain to the cuts, and the minimum strength is likely to be the result.

Broken crankshafts frequently show the effect of the manner in which they are made, in that they part in a plane parallel to the axis, through a crank arm, generally the one nearest the flywheel. If the crankshafts are from die (drop) forgings, this danger is not so imminent, because the grain lies in such a way as to afford the maximum strength.

If a crankshaft fails in service it is easy to lay it on to something besides the material or the manner of its fabrication, but as a rule the one or the other will be at fault. To simply duplicate the first error is but slight justice to the owner.

Take the question of changes in the contour of parts, the changes should be anything but abrupt. Most ungainly looking fillets of considerable radii would be much more to the point.

A great many members fail through the section in the plane of threads; this is due to the fact that the roots of the threads are V-shaped and as a rule too deep. The Sellers thread is considerably better, besides the thread should not go clean up to a shoulder. Undercut for a distance of at least a full thread and end with a fillet.

A hole through a shaft close to a shoulder will help to concentrate the strains and the end may be the shaft will twist off at that point. There are crankshafts in cars that have this fault and they have repeatedly failed on that account.

The pinion of a planetary gear must be made with a small number of teeth and the shaft cannot be of great diameter; the pinion should not go up to a shoulder with no fillet; the shaft will twist off at the shoulder, even if there is a chance of it not doing so, assuming a radius. The material should be extra good for a case of this sort.

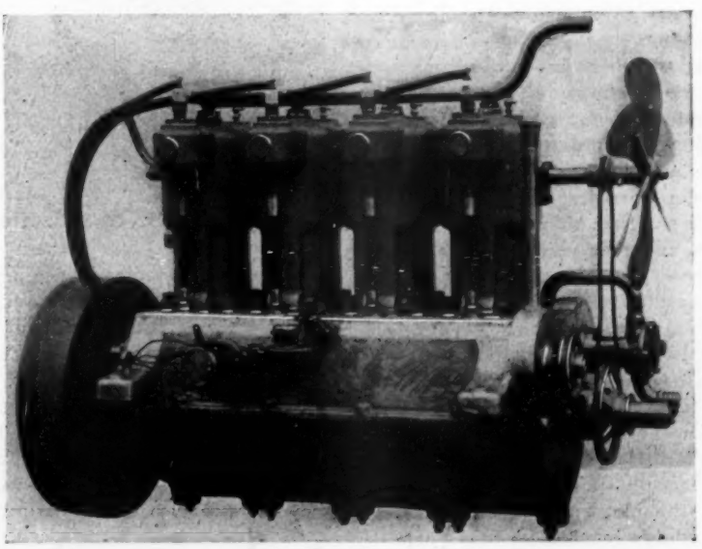
Keys will not hold unless they are fitted very tight. Put a boy on some other job, but put a machinist of considerable experience on the key fitting. A loose flywheel is not a pleasant thing to be ship-mates with in a swamp, miles from home.

When rear wheels come off, it is not safe to figure that the thing will happen in front of a hospital. They will come off if the fitting is not carefully done. As some cars are made, true, they may come off if the fitting is well done in certain cases. It is important to be very careful in such cases, and it will reflect no credit on the repair man who fails to do good work.

MOTORS THAT HAVE MANY DISTINGUISHING FEATURES

IT does not require more than a single glance to note that the motor shown by the accompanying illustration differs from automobile motors of its kind at present on the market. A closer inspection shows the view to have been taken from the inlet side of the engine, as will be evident from the attachment of the carbureter on that side, but the familiar maze of piping in the shape of manifolds that render access to the valve mechanism and other parts of the motor difficult, is entirely lacking. It will also be noticed that the ignition timer is placed directly alongside the carbureter, thus centering the parts most in need of inspection and adjustment at one point on the motor, and one that is entirely free from obstructions. Another striking feature of this motor is its lack of circulating water piping, as the only evidence of the latter is to be seen in the return pipe to the radiator, which runs along the top of the cylinders.

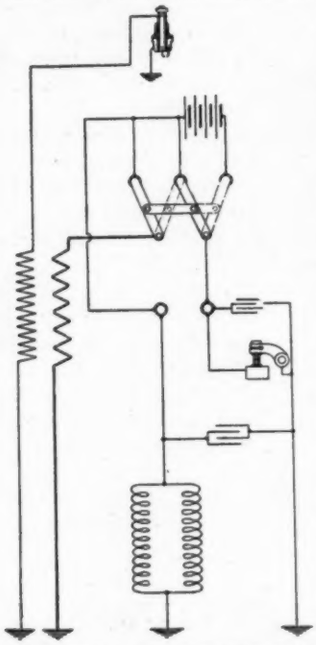
This great simplification has been accomplished by casting the individual cylinders with integral ports leading from the base up to the inlet valve openings. These ports in the cylinder castings correspond with similar openings cast in the upper half of the crankcase, or engine base. Both the gas manifold and the water-circulating pipes are cast on the inside of this base, thus making an extremely neat and simple motor, this location of the intake manifold also having the great advantage of warming the mixture. All connections are made at once, mereby by fastening the cylinder in place on the base. Five liberal-sized main bearings are provided for the crankshaft, and they are automatically oiled by means of oil tubes and wicks, in addition to the usual standard splash system. The water pump, of the gear type, is located forward on the exhaust side and connects directly through a short pipe to the cast piping inside the crankcase. A petcock placed on the latter permits of entirely draining the entire circulating system at any time. This crankcase is so cast that the camshafts, complete with their gears, may be withdrawn without disturbing any other part. The connecting rods are steel drop-forgings with bronze upper bearings and babbitted big ends. The flywheel end of shaft is provided with a thrust ball bearing. This motor is but one of the many types made by Piggins Brothers, Racine, Wis., who have had a long and interesting experience in motor building, having constructed a steamer as far back as 1883, an electric in 1897, and their first gasoline car in 1902, the latter being a two-cylinder four-cycle 4 by 4-inch engine, capable of making 18 miles an hour with four up. Their present line includes two, four and six-cylinder vertical motors from 4 by 4 1-2 inches up to 6 by 6 inches, and a special line of vertical two-cycle marine motors.



SIMPLICITY OF THE PIGGINS MOTOR, INTAKE SIDE.

NEW TYPE OF INDUCTOR MAGNETO.

Leon J. Le Pontois, who has made an extended study of the problem of automobile ignition for several years past, has just completed a new magneto of the inductor alternator type, in which the rotor consists of a crescent-shaped iron core carrying no windings. It is an extremely simple and efficient generator and differs in numerous respects from the magnetos now in use. The field magnets and the windings in which the alternating currents are generated by the rotation of the iron core are stationary, no brushes or current collectors being employed. The magnetic field is composed of a number of steel plates pressed into close contact by the frame and securely held by bolts.



WIRING LE PONTOIS MAGNETO.

Each of the plates, or laminations, is magnetized by a special process which tends to cause the steel molecules to assume permanently parallel positions in the axis of magnetic polarization in the V-shaped portions of the field magnets. In order to obtain this result, the V-shaped ends of the plates are first brought to the desired temperature and then suddenly cooled and thereby hardened, while their molecules are under the influence of a powerful magnetic field. The central portions of the plates, upon which the coils are wound, as well as the polar projections, are maintained thoroughly annealed during the process of hardening, the plates thus retaining their magnetism much better than when magnetized cold.

The V-shaped portions constitute the permanently magnetized portion of the magnetic structure. By thus providing the integral magnetic structure, which is hardened and permanently magnetized in certain portions, while it has soft portions of high magnetic permeability, it becomes possible to construct an inductor magneto having a good electric efficiency and a comparatively large output for its size. The extensions of one central portion are, therefore, say, of north polarity, while the extensions of the opposite central portion are of the opposite, or south polarity. The polar extensions around which the generating windings are placed are connected, as will be plain from the sectional view.

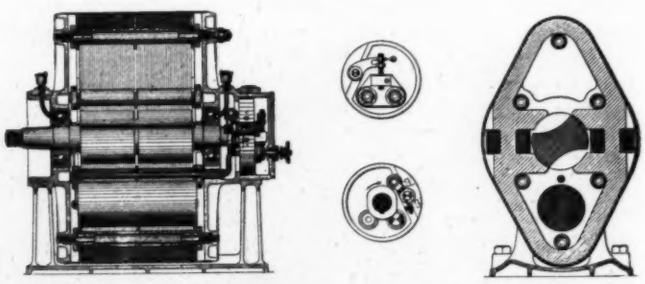
The rotation of the iron inductor causes the magnetic flux threading through the stationary windings wound on the bridges to pass from a maximum density in one direction to a maximum density in the opposite direction during a comparatively small angle of rotation.

The illustration shows face and rear views respectively of the circuit closer and interrupter, operated by a cam on the rotor shaft and serving to short circuit the combined circuit of the two stationary windings, excepting at or near the time when the current is employed to produce a spark. The means for closing and opening the circuit at the contacts comprise an arm pivoted to a part supported by the outside element of the machine. The shaft of the arm is oscillated by the engagement of a roller with the cam, which roller is carried by an arm, also extending from the shaft. The electric circuit is opened at the moment when the current induced in the stationary windings reaches its maximum.

The breaker is of an extremely simple construction and can be removed from the magneto frame at any time for inspection should the platinum contacts require cleaning or adjusting. Two pointers respectively located on the breaking arm and its frame permit accurate adjustment of the breaker point, and when the frame is placed back in its casing, in the magneto frame, the timing is perfect. The frame and magnets are mounted in bearings so as to be adjustable therein. By reason of the exterior form of the plates and of the magnetic field composed of them, it is possible to swing the whole structure (field magnet and the breaker) about their pivotal supports without causing the magnets to extend laterally beyond the center diameter, thereby permitting an effective spark range of about 80 degrees without increasing the space occupied by the magneto. It will be noted that the spark has the same intensity in any of the positions in which it is necessary to shift the magnetic structure in order to vary the time of ignition.

It will also be noted that the dimensions of the polar faces of the rotating element in operative magnetic relation with the polar faces of the stationary element are such that the total magnetic reluctance of the combined magnetic circuits changes very little in the different positions of the inductor when rotating within the stationary structure. This is due to the width of the polar faces of the rotor being greater than the distance between adjoining polar extensions of the stationary element. Abnormal magnetic leakage which would otherwise lead to ultimate demagnetization of the permanently magnetized portions is consequently avoided. This arrangement also greatly increases the rapidity with which the intensity and direction of the flux in the generating windings changes, and correspondingly increases the intensity of the current generated. Thus, it will be understood that although the change in the density of the magnetic flux through the alternative paths successively controlled by the rotor tends to correspond with the respective reluctance of said paths, yet by reason of the fact that the windings are short circuited upon themselves while the reluctance of the magnetic path is increasing, the current induced in the coils tends to oppose such change, and the rate at which the density of the flux decreases is not proportional to the increase in reluctance of the magnetic path.

It will be noted that owing to their position in the field structure and their mode of connection, the windings exert a preponderating magnetizing action on the field structure,



LONGITUDINAL AND CROSS-SECTIONAL ELEVATIONS AND BREAKER.

which tends to maintain the permanently magnetized portion of the field thoroughly magnetized. The wiring diagram shows the method of utilizing the breaker of the magneto in connection with batteries should it be desired to provide for double ignition. However, in actual service, it has been found that the electric output of the magneto is so great that the motor can be started by the crank without great exertion. The condenser is located within the magneto itself, but the induction coil is a separate unit. The armature rotates on annular ball bearings. The new Le Pontois magneto is being manufactured and marketed by Hurd & Haggin, 316 Hudson street, New York.

SELF-ALIGNING TAPER ROLLER BEARINGS*

By H. W. ALDEN, Member of Society of Automobile Engineers.

THE object of this paper is to present some facts concerning the design and action of certain forms of roller bearings and to illustrate their practical application to various automobile conditions.

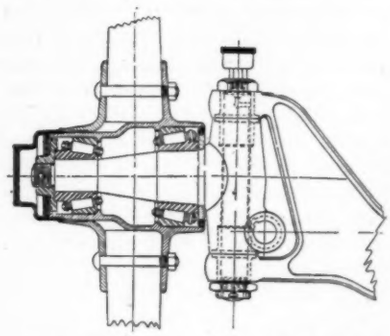
I will touch on just four phases of the question that arise in automobile practice, viz.:

(a) Side load capacity.

(b) End thrust capacity.

(c) Means for insuring correct alignment of rolls.

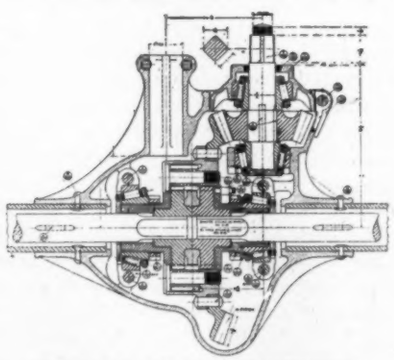
(d) Provision for taking up wear.



FRONT HUB, E. R. THOMAS MOTOR CO.

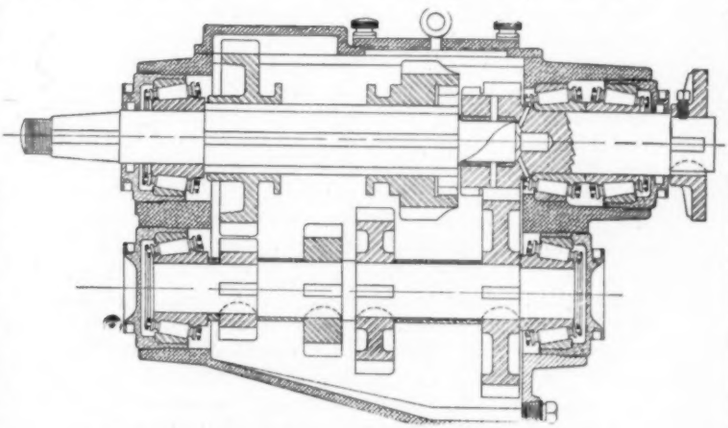
There would seem to be no chance for argument that in the abstract a roll should be capable of carrying a greater load than a ball of the same external physical dimensions, granting that material and workmanship are identical and eliminating the question of alignment of the roll. Comparisons made in this article will assume a ball bearing using a curved surface for the cone with a radius of .7 the ball diameter. No distinction will be made between the annular or radial, and the so-called bicycle type of ball bearing. In the roller bearing the diameter will be assumed, same as that of the ball with length equal to diameter.

If we consider that, when a ball or roller is loaded, there is an infinitesimal flattening out at the point of contact, then the load-carrying capacity, other things being equal, will be approximately proportional to the area presented to carry the load. We find that assuming the roll or ball and the cone to suffer a deformation of approximately one thousandth of the radius of the ball or roll, we get resulting areas in the ratio of approximately 7 1-2 to 1 for the roll and ball respectively. Now it is this remarkable showing that has tempted so many to experiment with the roller bearing. A search through the patent files of this country alone shows an almost unlimited number of attempts, very few, however, of which have ever come to light, and almost all of which have disappeared from view. Perhaps the majority of experimenters have tried the taper roll, which statement brings us to second point, end thrust.



FORTY-H. P. REAR AXLE ASSEMBLY.

The cases where a bearing is submitted to side load alone are possibly in the majority, but there are many cases where the bearing has both side and end load to withstand. This is particularly true in the case of the automobile, where perhaps the majority of the bearings have to stand thrusts, some of which, as in the case of wheels and bevel gears, are exceedingly severe. I think we sometimes fail to recognize the severity of this front wheel end thrust. When turning a corner of 25 ft. radius at 15 m. p. h., which is by no means rarely done, the end thrust on that front wheel bearing which gets the maximum thrust is just about the same as its legitimate side load. This bearing then ought, by virtue of its design, to be able to take about the same load one way as the other. Now this is a strong point of the taper roller bearing. It can be shown that such a bearing, having an included angle of approximately 23 degrees for the cup, can carry the same end thrust load as side load for a given surface pressure normal to the roll surface. I find that there is a pretty general impression that, in the case of a taper roller bearing, having an abutting shoulder, all of the end thrust load is taken on this small shoulder. This is not the case, as can be shown by a simple illustration. Suppose a complete bearing to be subject to end thrust, but not to be in motion. Now, while the load is still applied, remove the rib or shoulder on the cone, by screwing it back out of the way, for instance, and it will be found that nothing happens. No matter what the load, the rolls refuse to change position. Now rotate the bearing slightly and it will be found that, so long as the rolls remain in correct alignment, there is no

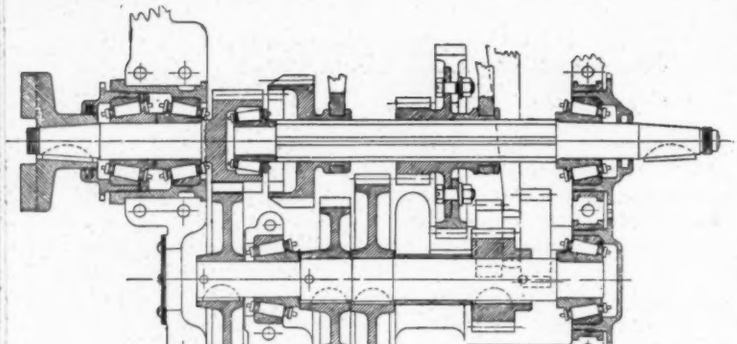


CHANGE GEAR SET MADE BY WARNER GEAR COMPANY.

axial change in their location. When they get out of alignment, however, they begin to creep back up the cone.

This brings us up to the third point in question, that of alignment. And this, be it said, is the feature of greatest importance in all roller-bearings. It is the rock on which many a roller-bearing has gone down. In the case of parallel roller-bearings, there is a peculiar but persistent tendency of the rollers to work endwise; not great, but still present. Now most parallel roller-bearings have some member either on the cone or cup, or both, to limit this action, and sooner or later the roll brings up against this abutment. So also in every taper roller-bearing, the rolls bring up with a certain slight pressure against this same limiting element. It is at this crucial point that roller-bearing designs and construction diverge. From this point all can be divided into two classes, those receiving this limiting effect at one end of the roll and those receiving it at both ends. Perhaps I should not have referred to the latter class in the plural, as there is only one where this effect is obtained, i. e., receiving this limiting action at both ends of the roll. If the roll bears ever so lightly against an abutting shoulder at one end only, the tendency is to exert a slight retarding effect at this point which disturbs the alignment. With the correct alignment

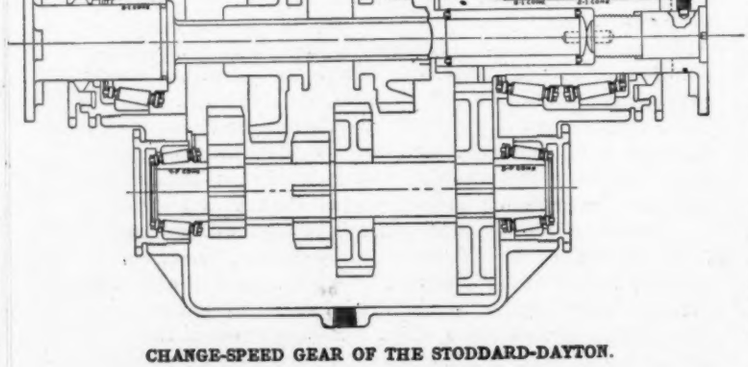
*Paper read before the Society of Automobile Engineers at New York.



TYPE OF GEAR SET THAT IS USED ON THE AUTOCAR.

gone, there is then not pure rolling action, but a rubbing action, and furthermore the area of contact at once is greatly reduced. In other words, sliding friction has been substituted for rolling friction, and the contact area to carry the load has been reduced. The life of the bearing is therefore greatly reduced. When, however, this slight retarding effect is applied equally to each end of the roll, it is changed from a disturbing action to an actual guiding action.

When the Timken Company first began work on taper rolls, they, like all others before them and some since, had but one rib on the cone, and their earlier experiments were all failures, as could have been predicted had the proverbial foresight been as good as "hindsight." Upon the introduction, however, of the two ribs, the alignment difficulty disappeared, and some seven years' experience covering many forms of application prove the fundamental value of these two ribs. Another feature of the taper roller-bearing which appealed at the outset was the ability to take up wear with this form of bearing. We like to think that wear does not occur with pure rolling contact, but the bulk of the experience of users of bearings shows that in most cases wear does occur. If it cannot be taken up, it continues at an increasingly rapid rate, whereas, if it can be taken up, the bearing is ready to start out fresh again. Doubtless for some service, size and material can be chosen to eliminate wear from practical consideration. These cases are limited, however, and even in such cases a larger amount of material must be used than would be required if some wear could be tolerated. On the whole, then, from a practical standpoint, the taper roller-bearing using two ribs has good reason for its existence, because of its area of contact giving large side load capacity; its large inherent and thrust capacity; its insurance of correct roll alignment, and its adjustability for wear.

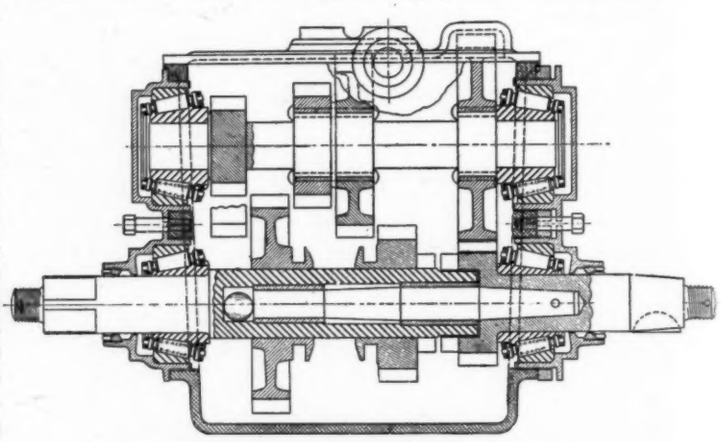


CHANGE-SPEED GEAR OF THE STODDARD-DAYTON.

USING OXYGEN TO INCREASE MOTOR POWER.*

It seems difficult to realize that the practice of "doping" may be extended from the race course to the automobile track, or *du sport hippique au sport mécanique*, as our Gallic confrères put it, but this is nevertheless the case, "drugged" motors having been used at Brooklands. But the drug in this case is simply oxygen, and the following is an elementary explanation of the phenomenon. It is a matter of common knowledge that the energy created by the four-cycle motor comes from the expansion of gas, raised by rapid combustion to a high temperature and pressure. These two values, temperature and pressure, are connected by a direct relation, the pressure on the piston, which is transformed into mechanical work, being greater as the temperature is higher. This relation permits of calculating the value of "doping" a motor.

Why this temperature should be so high is also easily explained. It is conceded that the explosion is an adiabatic combustion under constant volume. The heat produced by the combustion being employed to raise the temperature of the resulting gases, if we know the specific heat of these gases under constant volume, it will be easy to value the temperature theoretically attained. In the case of oxygen the weight of the gas to be warmed is less than that of air, since the latter is constituted, in weight, of 79 per cent. of an inert



GEAR SET OF THE THOMAS DETROIT "FORTY."

gas, nitrogen, which does not participate in the reaction, but which must, nevertheless, be raised to the high temperature.

For an equal quantity of heat disengaged, the weight of the gas to be warmed, in the case of air, is greater as the temperature to be attained is lower, and it is calculated that the theoretical temperature attained by a gasoline flame in pure oxygen is 7,000 C., while it does not surpass 2,500 degrees C. in air. From this the enormous influence on the thermodynamic output of the motor which may be gained by the use of oxygen is evident. It must be borne in mind that there can be no question of supplying pure oxygen to a motor constructed according to present standards, as the explosive pressure reached would be such as to utterly destroy the cylinder. It is also necessary to radically change the conditions of carburetion, the amount of air necessary for complete combustion of a given weight of gas being diminished as the proportion of oxygen is augmented. It will be seen that this artificial enrichment of the mixture may be of considerable utility in certain cases, such as aviation.

The results already attained by M. Jaubert with an Aster motor, using "oxylithe," an alkaline peroxide producing oxygen in the presence of water, which is an invention of his, show that the injection of three liters of oxygen per horsepirated, gives an increase in power of 70 per cent.
power-minute, or 4 to 5 per cent. of the total volume as-

*Translated from "La Vie Automobile," Paris, by Charles B. Hayward.

LETTERS INTERESTING AND INSTRUCTIVE

A METHOD OF OILING THE MAIN BEARINGS.

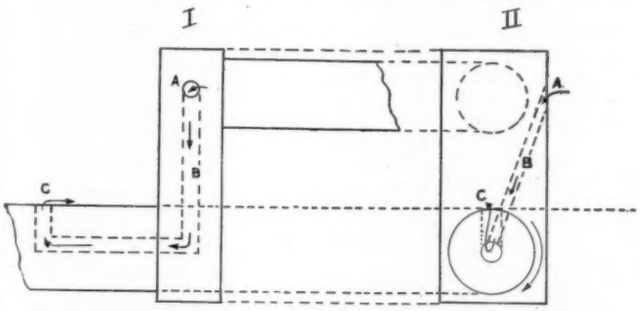
Editor THE AUTOMOBILE:

[1,188.]—Will you kindly tell me if you think this system of oiling the main bearings of a motor would be efficient? Enclosed is a rough sketch. The crank dips into the oil in the crankcase and some is forced into the hole at A. The passageway B becomes filled by the repetition of this and gradually the oil is forced out at C and lubricates the bearing. Do you think the centrifugal force would throw the oil out and so prevent it from reaching C? The other parts of the motor are to be oiled by the splash system.

Will you also give me the dimensions of standard auto frames? That is, the width at the front between the side members and the same for the back. BUILDER.

New York.

It is customary with quite a few American makers to drill the crankshaft in order to facilitate lubrication, and centrifugal force is taken advantage of to carry surplus oil fed directly to the main bearings, through holes to the crankpins. In the arrangement you outline there is nothing to prevent centrifugal force throwing the oil out of the hole faster than it can be forced in; in fact, it is doubtful if centrifugal action would permit any oil to reach the bearings through these holes. You are trying to force oil from a point on the



DETAILS OF THE PROPOSED LUBRICATING SYSTEM.

circumference of a circle to its center against the action of centrifugal force, which is constant, so that it will be plain that such an arrangement would not be practical.

Frame dimensions differ so much with different makers that it would be difficult to say whether there is such a thing as a standard for this essential. On touring cars the frame is narrowed forward to about 36 inches, in some cases slightly less and in others not so much. The width back of the motor is anywhere from 40 inches upward, but will probably not be found to exceed 48 to 50 inches in any case, as few cars exceed the standard tread, which is 56 inches. In a few instances the frame is not narrowed forward at all, in which case it will seldom be found to exceed 38 inches in width. This would probably only be found on what are known as light touring cars; also low-powered runabouts.

KEROSENE AS A NON-FREEZING SOLUTION.

Editor THE AUTOMOBILE:

[1,189.]—Would you kindly state in your "Letters Interesting and Instructive" if kerosene is a good non-freezing solution to be used in cooling an engine? Would kerosene in any way affect the steel or working of the engine? If it does not, what per cent. should be used for Chicago weather? G. B.

Chicago, Ill.

If you will refer to letter No. 1078, from F. R. Zeigler, and the answer thereto, which appeared in the issue of THE AUTOMOBILE of January 9, 1908; also letter, No. 1129, from Cecil Carr, published in the issue of January 23, 1908, we think you will find the subject pretty well covered. Kerosene would have no bad effect on the metal of the engine and it would have to be used "straight" for Chicago, or any other brand of weather.

RECORD-BREAKERS IN VARIOUS SPEED TESTS.

Editor THE AUTOMOBILE:

[1,190.]—Please let me know through "Letters Interesting and Instructive" the following facts:

(a) The date and time of the Stanley steamer one-mile record.

(b) The date and time of the winners of the Fort George hill climb.

(c) The date and time of the 1,000-mile record.

New Rochelle, N. Y. CORNELIUS SHIELDS.

The Stanley steamer one-mile record was made on the Ormond-Daytona beach, January 25, 1906, Fred Marriott driving. Time, 0:28 1-5. Frank Leyland, driving a Stearns six-cylinder car, made the best time in the Fort George hill climb, August 3, 1907; time, 28 1-5. Time made by other winners was as follows: Class 100 to 125 square inches, C. P. E. Schilpp, on 60-horsepower Stearns, 32 2-5; class 80 to 100 square inch, P. J. Robinson, on 35-horsepower Stevens-Duryea, 36 1-5; class 60 to 80 square inch, J. P. Grady, 30-horsepower Pope-Hartford, 39 3-5; special for Stearns cars, W. A. Tilt, 44 4-5; electrics, H. E. Wagner, on Babcock, 1:53 4-5. The world's 1,000-mile record was created by S. F. Edge in his 24-hour run on Brooklands track, England, June 28-29, 1907. No time was taken for the thousandth mile, but at the end of the fifteenth hour the distance covered was 1,006 miles 1,640 yards. The American 1,000-mile record belongs to Clemens and Merz, time, 21:58 4-5, on a 30-horsepower National, at Indianapolis, November 17, 1905.

TAKES A NEW MAN TO CRANK IT EVERY TIME.

Editor THE AUTOMOBILE:

[1,191.]—I have a car which is giving me endless trouble. It wears a negro out each time it is cranked, and when once it decides to start the engine apparently runs all right until the low speed is thrown in, when she begins to stop, and when the high speed is thrown in, stops completely. The engine has just been overhauled, has good compression, and turns easily when the spark plugs are removed. The carbureter is located ahead of the cylinder and at about the same level, and uses cold air. Have tried two Kingston and one Schebler carbureters, one-inch size. Would it help materially to hang this carbureter under the engine, or by its side (which would cut off about 1 1-2 feet of pipe and one bend), and take hot air from off the exhaust pipe? Do you think a 1-inch carbureter large enough for this 20-horsepower engine? On account of the carbureter being on a level with the engine cylinder, does this allow too much gasoline to get in and make too rich a mixture? I notice in most engines the carbureter is below the cylinder inlet. Can you make me any suggestions?

Birmingham, Ala. S. B. SLATER.

Judging from your statement of the case, it would seem that the trouble might be due entirely to deranged timing either of the valves or ignition; that is, the ignition timer has become so placed that while it will run the engine, the spark occurs in such a period in the stroke that there is barely enough power developed to turn the engine over light. The moment that any considerable load is applied, it naturally comes to a stop. This also accounts for the great difficulty you mention in starting, as it is next to impossible for any one cylinder to generate enough power to turn the engine over so that it will take up its cycle. Look to the ignition timer and set it with relation to the piston of the first cylinder, so that the spark occurs—the advance lever on the wheel being about one-third way down the sector—when this piston is at the upper dead center and about to descend on a power stroke. To find this out, the spark plug should be removed and a stiff piece of wire dropped into the first cylinder, either through a spark plug or a petcock opening, so that the position of the piston may be checked. The valve covers should also be taken off, so as to ascertain when the piston is about to go down on a power stroke. This will be when both valves have remained closed on the upstroke immediately preceding. Having ascertained this, see if the

provision for fastening the timer on its shaft coincides with this setting. If any special arrangement has been made for preventing the timer from rotating on its shaft, this should be the case, or at least it should come very near one way or the other, and if so, the timer should be fastened in its original position. Also look to the timer contacts and spring, and to the vibrators of the coils, as unusual delay in the action of either of these parts often accounts for a great loss of power.

The one-inch carbureter is plenty large enough for the engine in question, and as numerous motors run very successfully with a carbureter in the position you mention, the arrangement is hardly to be condemned on that account alone, although, in our opinion, dropping it a foot or so in order to take advantage of the greater length of the manifold will make the mixture more homogeneous and freer from liquid gasoline and might prove a more satisfactory arrangement. Using hot air might also be an improvement.

The valve-timing should also be carefully checked in the same manner; that is, with the aid of the wire mentioned to determine the piston's position and with the valve covers off to note their movements. Beginning with the power stroke for which the ignition has been set, see that the exhaust valve opens at a point about 15 to 20 per cent. of the length of the stroke from the lower end and remains open until the following upstroke has been fully completed, when the inlet valve should rise, remaining open until the piston has passed the lower dead-center and has risen to a point about 10 to 15 per cent. of the length of the stroke from the bottom. If there be no flywheel marking to aid in checking this, the wire will be found valuable, as it may be marked in fractions of the length of the stroke, or the marks may be made on the periphery of the flywheel as you proceed, beginning with the upper dead-center just before a firing stroke and measuring in degrees on the flywheel circle, the exhaust valve being given a lead of 30 to 40 degrees and the inlet 20 to 30 degrees late in closing. Unless something has happened to disturb the position of the cams on their shaft, the setting of the first cylinder will suffice for all, and we feel certain that with the valves and ignition properly timed you will have no further trouble from lack of power.

ECONOMY OF FUEL OR IGNITION CURRENT.

Editor THE AUTOMOBILE:

[1,192.]—A number of "Letters Interesting and Instructive" have dealt with the subject of current consumption of coils from the standpoint of battery economy, but not much is said about fuel economy.

Is it not true that some of your correspondents over-rate the importance of reducing current consumption to the minimum, or, in other words, will a coil do its maximum work when adjusted to consume the minimum amount of current? Is it not more economical to adjust for the hottest possible spark and thus reduce fuel bills, at the expense of battery bills? How much current per unit should a Splitdorf coil consume to do its maximum work?

The makers of mechanical storage battery chargers intended to be mounted on automobile engines very properly tell us of the advantages to be gained by their use. I would like to know what their disadvantages are, or at least the most serious and common ones. Does the vibration, dirt and water to which their position exposes them render them more or less unreliable or troublesome? Are they likely to injure battery by overcharging?

Pontiac, Ill. SUBSCRIBER.

Extensive experiments have shown that beyond a certain point little or nothing is gained in actual practice by making the electric spark "fatter" or hotter. In every-day practice this is found to be about the minimum that the engine will run regularly on. The average autoist has no facilities for determining current consumption beyond a rather liberal range of error, and as the latter is on the side of excess rather than the reverse, the practice of adjusting coils to take the minimum consumption of current is economy in every sense of the word, and using more current would not be a gain in the fuel supply. The experiments referred to showed conclusively that beyond the point where sufficient current was employed to properly ignite the charge there was no further gain in power nor saving in fuel consumption by using more current. Too many carbureters are poorly adjusted, and this accounts for a great deal of waste that is only too often put down to poor efficiency on the part of the engine. The latter will run better on a minimum fuel charge and do better work. We cannot say how much current any particular coil will require without putting it to test, but any well made coil will operate under very favorable conditions on as low as .25 ampere. As the conditions vary, this will increase, but on a properly kept system it should not exceed .50 to .75 ampere. Some coils are very poorly designed and cannot be made to operate satisfactorily on less than 1 to 2 amperes.

The difficulty with any direct-current generator on an automobile engine is that of maintaining its speed within a reasonable latitude of the r. p. m. rate at which it gives its normal output. A well built dynamo of this type will operate at as low as 1,500 r. p. m., but to get this speed at a low engine speed it has to be run from the flywheel or geared up several times in some other manner. When the engine reaches this speed the dynamo would be making anywhere from 6,000 to 10,000 r. p. m. and immediately be burned out if it were not for the governor. Sensitive and reliable governors have been adopted, but the system is not looked upon with great favor by many designers. Vibration, dirt and water has no effect on the generator, as it is usually "ironclad," i. e., completely inclosed, nor is the battery liable to be overcharged, as an automatic cutout is generally employed to prevent damage either from this cause or from stopping, which would otherwise allow the battery to discharge itself.

DIFFERENT OPINIONS ON LUBRICATION.

Editor THE AUTOMOBILE:

[1,193.]—My chauffeur holds that there being three divisions in a six-cylinder engine crankcase, and oil supposed to be in these three divisions, that, should one of these be empty, the bearing at that part of the crankcase will run hot. I differ with him, and state that this would practically make no difference at all; that if there was plenty of oil in even one division, this would be beaten up into a mist by the rapidly revolving crankshaft, and this mist would permeate every part of a crankcase.

The chauffeur quoted a case to me of a six-cylinder car here that he knows of, the back bearings of which melted out in the manner described. I assert that if the back bearing was melted out, it was because there was not sufficient oil in any part of the crankcase, which any part of the crankshaft could reach, consequently there was no mist of oil to reach that, or any other part of the bearings, and that if he had driven very much further the other bearings would have melted out also.

The chauffeur also states that the raising of the springs in the back part of the chassis by putting a block under them would so disturb the level of the engine that the oil would be constantly in the front compartments, and not behind. I stated that this was manifestly ridiculous, because every little inequality in the road, which the front wheels surmount, would more than compensate for the difference of an inch or two rise in the chassis behind, and I pointed out to him that in going up or down a steep hill, or over a rough road, any raise of a couple of inches in the back springs counts for little or nothing in the level of the engine. He then asked, Why is the crankcase separated into compartments? And I said that, after all, it is desirable to have the oil evenly distributed, and that it costs practically nothing to make those divisions. Will you please state which is correct? CHAUFFEUR.

Toronto, Ont.

Your chauffeur is correct in the stand he takes regarding the oil level in the crankcase. A high-speed engine not only runs very fast but gets very hot, and requires something considerably more substantial than a mist or spray of lubricating oil to properly oil its main bearings. Moreover, a six-cylinder engine is very long and it will be quite evident that if there were only oil in the forward compartment this would be of very little benefit to the rearmost bearings, unless the quantity in the forward ones was excessive and one over-

flowed into the other. This rear bearing does the major part of the work and is usually made much larger; consequently, it not only has to have more oil proportionately, but the importance of a constant supply is also greater, as otherwise it will cut or melt out sooner.

The instance that your driver cites is not an uncommon one and would be quite possible with the normal supply of oil in the front compartment, and probably with this quantity in both the front and middle compartments, as the partitions may be quite high. Therefore it does not follow that the crankcase as a whole was dry. Even with a very little oil, the result of the splash is more than a mere mist.

Your driver is also correct in his contention that raising the rear part of the chassis will disturb the engine level and might interfere with the oiling, unless provision was made to counteract it. You forget that every little rise of the road is both up and down, so that one counteracts the other, whereas, an inch or two rise of the rear of the chassis is always in one direction. To put it in common parlance, "it is working all the time." The crankcase divisions are for the purpose of preventing the oil from shifting from one end or the other, due to inequalities of the road or climbing or descending hills.

SOME PLANETARY WHYS AND WHEREFORES.

Editor THE AUTOMOBILE:

[1,194.]—The instructor of an automobile school at which I was a student gave us the following problem to work out by calculation: If in a planetary gear the crankshaft makes three revolutions each time the rear wheels make one at high speed direct drive, how many revolutions will the crankshaft make at low speed each time the rear wheels go round once? The internal gear has 66 teeth, pinions on sprocket 21, driving gear 24 teeth. We gave it up. The instructor told us how to do it, but could not explain at all satisfactorily the why and wherefore, and I can see no reason for his method, which is as follows: Divide the number of teeth of internal gear (66) by the number of teeth on pinion (21), which equals 3 1-7. Then divide number of teeth on driving gear (24) by number of teeth on pinion (21), which gives the quotient 1 1-7. Then multiply the two quotients, 3 1-7 by 1 1-7 = 3 29-49. Multiply this product by 3 to find the number of revolutions the crankshaft makes each time the rear wheels make one. Answer, 10 38-49. Is this correct?

In studying the planetary gear itself, I could see that the driving gear made an extra revolution, but could not and cannot see exactly why and how it does it. You say, in your answer to letter No. 1,138, in your issue of February 6, "it will be evident that the central gear will have to make one more complete turn to drive the planet round its orbit than the direct relation between the driving gear and internal gear." Will you please explain?

How can I find out about the roads and hotels between Boston and Deerfield, Mass.? As one of the party is not very strong, the daily runs could not be long, and the hotels would have to be comfortable. H. L. JONES.

Roxbury, Mass.

It will be apparent that when two toothed wheels are in contact and one drives the other, the speed of the driven wheel will depend both upon the speed of the driver and upon the relative sizes of the two wheels. For instance, if the driver runs 100 r. p. m. and both are the same size, the driven will also make 100 r. p. m.; if the driven pinion be half the size, it will make 200 r. p. m.; if twice the size of the driver, 50 r. p. m. Hence, dividing the number of teeth in the driven wheel by the number of teeth in the driver will give their relative speeds. In the case of the planetary gear the planet, or pinion, acts as an intermediate driver, so that the first operation mentioned gave the relation between these two and showed that the pinion made 3 1-7 revolutions for every one of the internal gear. The second division showed, as a result, that the pinion made 1 1-7 revolutions for every turn of the driving gear, and the product of the two would give the number of turns the crankshaft made for each revolution of the internal gear. The gear ratio of the car being 3 to 1 on the direct drive, multiplying this product by 3 would give the number of turns of the crankshaft on the low gear. Regarding the second query, it will be evident that if the driver and the pinion were both the same size, the pinion would make one turn for every revolution of the driver, as already explained; that is, assuming the pinion to be free. But it is not, as it meshes with the teeth of the internal gear as well as with those of the driver, hence its travel is restricted by the former and for every turn of the driver the pinion makes less than a complete turn, amounting to one complete revolution of the driver in the time taken by the planet to traverse its orbit, or the internal gear.

The best route to Deerfield from Boston is via Worcester, 44 miles; Springfield, about 65 miles, and Deerfield, 30 miles, taking each of these stretches as a day's run. Full information in detail on all New England routes is given in the Official Automobile Blue Book of the American Automobile Association. This gives the nature of the roads, exact distances, all turns, hotels, garages and the like.

HOW ABOUT IT, MR. DESIGNER?

Editor THE AUTOMOBILE:

[1,195.]—Is it necessary for a designer to have all the different formulæ by memory, without reference to books or written formulæ while he is at his work? I would like to get all the information I could about this. How many hours a day do designers work—that work for automobile companies? What is the best book or set of books, in your estimation, for designers' work, and the price of same? Do they have on the market tables or scales for finding the decimal equivalents of eighths, sixteenths, thirty-seconds, etc., parts of an inch? J. L. BENEDICT.

Lehmaster's, Pa.

Just how much an automobile designer remembers, that is, constantly carries in mind, of his mathematics, is a matter that depends very largely upon the personal equation. Some men are able to carry a great deal more in their heads than others, though it is safe to say that in making calculations involving the use of anything but the commoner formulæ, it is customary to use an engineer's pocketbook, which contains a mass of technical information in form for quick reference. The designer also employs other reference works and data, whether his memory be good or bad. It would be a waste of gray matter to attempt to carry "under your hair" a great deal of stuff that is preserved far more accurately and in better form on the printed page. A designer's work depends upon how busy he is at the time; he may put in 20 hours out of 24 when rushed, but ordinarily keeps the usual office hours of 9 to 5. So far as we know, there is no book, or set of books, especially written for the use of the automobile designer. A good general knowledge can be obtained from Homan's "Self-Propelled Vehicles" and Hiscox's "Gas, Oil and Gasoline Engines," which will be mailed at $2 and $3.50 respectively. You will find this in any engineer's pocketbook, such as Kent.

REMEDIES THAT GARAGEMEN ADVOCATE.

Editor THE AUTOMOBILE:

[1,196.]—Let me ask a question, to be answered in "Letters Interesting and Instructive." Usually the front wheels of an automobile are slightly nearer together at the bottom than at the top. Suppose that after some use this difference disappears. Is that condition of any serious consequence? And if your garage man advocates having the front axle bent so as to restore that difference, is it advisable to do so, and where can it be properly done?

Cambridge, O. FRED. L. ROSEMOND.

The mere fact that the wheels were in this condition would not be serious of itself, but the fact that they had gradually assumed that position might be indicative of serious trouble. The object of placing the wheels slightly out of the vertical, inclining outward, is to give them a better grip on the road in order to facilitate the steering, which will become more difficult and less certain as they approach the perpendicular. It would look as if the bearings had worn, or the spindles or steering knuckles on which they turn had become bent. The wheels should be removed and these parts examined and any defect of this nature remedied. Bending the axle to

compensate for such a condition would merely be making a second defect to remedy the first, unless the cause is primarily due to a bent axle, which may also be the case.

WHAT CAUSES THESE EXPLOSIONS?

Editor THE AUTOMOBILE:

[1,197.]—Through "Letters Interesting and Instructive," please explain why natural gas and air will cause an explosion when pumped together under pressure in the same pipe line. There have been two explosions at the same place here within two weeks. An air compressor is used to pump air during the day and help out the gas pump at night. The explosion occurs at the time the gate is opened which turns the gas in about 100 feet 8 inch line which contains air. The gas pressure on the discharge line is about 150 pounds.

Shinglehouse, Pa. HERBERT McGREGOR.

Natural gas and air will form an explosive mixture when present in the proper proportions, just the same as gasoline vapor and air, or any other hydrocarbon. It seems evident that permitting the gas under pressure to enter the pipe containing air sometimes creates such a mixture, but that ordinarily this does not occur, which would explain the infrequence of the explosion. It also seems evident that the pressure of 150 pounds to the square inch is sufficient to ignite such a mixture, which would explain its explosion whenever it happens to be present. Some way of permitting the air to escape as the gas was admitted so that the two would not combine under pressure would provide a remedy.

A PROBLEM IN STORAGE BATTERY ETHICS.

Editor THE AUTOMOBILE:

[1,198.]—We would like to ask you about the storage battery we have on our engine. We bought it with the auto and used it about 500 miles. It got weak and we then used dry batteries the rest of the season. We left the storage battery just as it was all winter, and in the spring we had it recharged with chemicals and electricity. But the chemicals all leaked out. Then we took off the bottom and found that all the glass jars were broken, three in all there was. We then took it apart and found that one jar was half full of wax, another one-third full, and the other one-half full. We took all the wax off; tied the plates together with the strip of wood between and left them that way this winter. Now, what we would like to know is if we get new jars next spring and put it together again and recharge it with chemicals and electricity, will it be as good as ever, or would you consider it worthless after going through what it has. Was it not strange that it worked at all with so much wax in each jar? It worked well for 500 miles.

Bemidge, Minn. THORN BROS.

If none of the active material has fallen out of the plates, and the elements are properly assembled and charged, they may give service again at a reduced efficiency. It would not cost much to try the experiment. Probably the cells operated for 500 miles before the jars broke.

MAGNETO VERSUS THE ACCUMULATOR.

Editor THE AUTOMOBILE:

[1,199.]—What is the advantage, if any, of a magneto over a good storage battery? I have a four-cycle, four-cylinder engine, and if a magneto would be better than a storage battery, I will get one.

Ehrichsville, O. ALEX. ROBINSON.

The necessity for recharging the accumulator at certain stated intervals, whether it be in service or not, is accounted one of its greatest disadvantages, and the fact that unless watched it may need recharging through exhaustion from service at an inconvenient time is another. However, the storage battery is a very reliable and simple method of providing ignition current on a car, and where given a modicum of regular care will carry out its rôle at a fraction of the expense of a magneto, though, of course, the expense for recharging is a more or less constant item and depreciation is relatively high. The magneto is probably less subject to trouble than any other form of current supply, though despite its simplicity it is not as generally understood as it should be. Its first cost is relatively high, but its upkeep is merely nominal, and it has a very high factor of reliability and efficiency.

TESTING THE IGNITION COILS.

Editor THE AUTOMOBILE:

[1,200.]—I wish to know whether the ordinary volt and amperemeter, such as is used to test the voltage and amperage of dry cells, can be used to test how much current is being consumed by the coil, or whether it is necessary to get a special coil current indicator. If, as I am informed, the former can be used, what points of contact do you bring into the circuit? The plug hole and the vibrator, I imagine, or is it possibly the vibrator and the metal of the car? Further, what is the maximum the coil should consume for a two-cylinder, 12-horsepower car?

Asheville, N. C. CHARLES L. MINOR, M.D.

You will find an answer to your question in the last issue of THE AUTOMOBILE, i. e. February 6, letter No. 1,135 on page 179. The current necessary depends on the coils and vibrators, not on the size or power of the engine. A properly designed, well-built coil that is correctly adjusted will work satisfactorily on .50 ampere, or less, as it has been shown that it is possible to operate on as low as .10 ampere, but this calls for very favorable conditions.

FURTHER TESTIMONY AGAINST THE NOZZLE.

Editor THE AUTOMOBILE:

[1,201.]—In letter No. 1,147, Mr. Bates says he agrees with Mr. Fay regarding the needle valve on the carbureter. He tells of making a nozzle with an opening smaller than a No. 60 drill. A hole of this size is going to get stopped up quicker than any needle valve opening I have ever seen. And, who carries with them such a thing as a needle to clean out such openings? On the other hand, it takes a man who is equipped with a shop to put on these nozzles, as very seldom will two engines take the same size nozzle. For this reason the needle valve has been adopted. The nozzle must be a certain height and the float adjusted for that height nozzle. Gasoline should be strained and also a strainer be placed between carbureter and gasoline tank.

I think it is safe to say that the gasoline mixture is lighter when the engine is running fast than when at slow speed, provided the carbureter is set for slow speed and the needle remains in one position. To back this statement, let me ask why it is that Schebler is going to the expense of making a carbureter on which there is a mechanism to open the needle valve as the carbureter throttle is opened? They also have a compensating air valve on this carbureter.

I have not inspected any foreign cars, and I do not remember any high grade cars without a needle carbureter, especially the newer models. C. S. VIALL.

Chicago, Ill.

PERMANENTLY POLISHED AUTO MATERIALS.

Editor THE AUTOMOBILE:

[1,202.]—The letter of M. G. Augspurger, in your issue of January 16, No. 1,108, brings up again a question about which much has been written and very little accomplished. The needs of automobile construction have brought about changes and improvements in materials which ten years ago would have been considered impossible, and it would seem that some of our American metallurgists would be able to suggest some practical substitute for brass, which would not oxidize or tarnish and yet be strong and ductile enough to be used in the manufacture of accessories, levers, etc.

I have heard of a system of heat treatment with zinc and aluminum which is used in England for rendering steel non-oxidizing, and understand that it is not a plating system, but that the surface of the metal is mechanically changed to produce the quality.

If any of your readers have information with reference to this or any other system of giving polished metal these qualities I am sure that a general discussion of the subject would be beneficial to the trade. OWEN THOMAS MOTOR CAR COMPANY,

Chicago, Ill. W. Owen Thomas, vice-president.

INFORMATION ABOUT GEORGIA ROADS.

Editor The AUTOMOBILE:

[1,203.]—Answering "H. L. Y.," of Toledo, O., in letter No. 1,152, wish to say that I live near Waycross, Ga., and have owned a Cadillac runabout for the last two years, and while the majority of South Georgia roads are a little sandy, there are very few that this little car will not take on the "high." There are several cars owned by country people near me, and they have no trouble going anywhere they want to in this and adjoining counties. And these cars are nearly all low-powered runabouts.

Will be glad to have a letter from "H. L. Y.," provided he wishes any further information. H. D. BUNN.

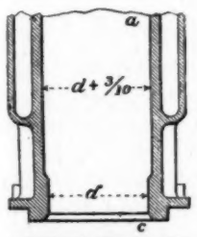
Fairfax, Ga.

HINTS AND SUGGESTIONS FOR THE AUTOIST

WE do not think the penetrating powers of kerosene are fully appreciated, says *Autocar*. When a nut or bolt sticks and cannot be moved with a key as long as one dare use for the particular nut or bolt, kerosene is the remedy. It should be squirted all round the stubborn thread. From time to time we have been told by automobilists to whom we have suggested this remedy that it has failed. Except in quite unusual cases this failure has been due to lack of patience. It must not be expected the moment the kerosene has been applied to the thread that the trouble will be over. The nut or bolt should be left for several hours for the kerosene to soak in; then it is almost certain to penetrate. When the nut is in such a position that kerosene runs away without soaking into the thread, it is necessary to fix up some little dodge for stopping this. A simple way is to wrap a rag round the nut and thoroughly saturate it with kerosene, or, in extreme cases, to file a little channel on or about the nut or bolt head, so that some of the kerosene is retained and left to soak into the thread. An excellent example of the penetrating and freeing power of kerosene was afforded the other day on a car having cups over the valves taking the form of large gunmetal plugs, and screwing into the valve chambers by a box spanner with a two-foot lever. It would have been possible to get a longer lever, but it was not considered safe to apply any greater force. We contented ourselves by giving the plug a copious dose of kerosene and leaving it till the next day. After twelve hours soaking the plug came out quite easily.

A Hint on Fitting Piston Rings.

When new piston rings are being prepared it is a common practice, when they are almost ready, to test their size in the base of the cylinder, writes a correspondent to *Omnia*. It should be noted, however, that the cylinder has had less wear at this point than at any other position, and if it is desired to obtain a perfect fit care should be taken to first of all reduce the unworn part of the cylinder to the exact diameter of the upper portion worn by friction of the piston rings. The reduction may be made by the use of a cylindrical block of wood covered with fine emery cloth. When by this means a uniform diameter has been obtained along the entire length of the cylinder, a ring fitted at the base will be gas-tight in every other position.



UNEVEN WEAR OF CYLINDER.

What to Do When the Motor Seizes.

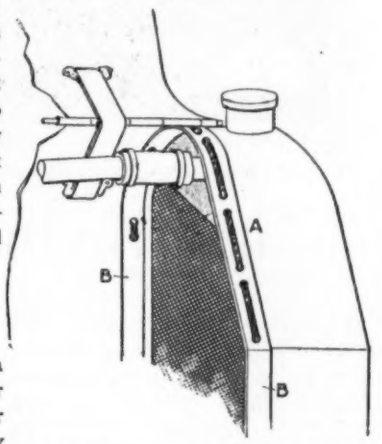
A seized motor, generally looked upon as a serious accident, need not necessarily be a very terrible affair. If it should happen that through neglect or any other cause the motor is allowed to run without lubrication, heats up and stops, so that piston and cylinders form as it were one block, the best method is to open compression cocks, or if there are none take out spark plugs, or dismount the inlet valves, then pour in a liberal quantity of kerosene. The automobilist may exclaim that kerosene is difficult to find on a car; but it should not be so. It is so useful in a hundred different ways that a couple of pints should always be carried. After the kerosene has been poured in, rest a while to allow it to penetrate, then try to turn the motor over. If after a liberal soaking with kerosene it is still impossible to turn the engine, the car should be put into low gear, the clutch left in and the vehicle vigorously pushed by as many willing hands as are available. Generally such treatment will have the desired effect, the kerosene will work its way round the cylinder walls and allow the motor to be turned over as readily as usual.

If all this should prove unavailing it can safely be concluded that there is something seriously the matter with the motor, and humiliating though it may be, the best plan is to slip into neutral, get a horse, and proceed in this undignified manner to the nearest auto repair shop.

After the kerosene has done its work of releasing the locked pistons, it should be remembered to empty the crankcase by the cock provided for that purpose in the base. Then add the necessary quantity of lubricating oil and proceed.

To Prevent the Bonnet Rattling.

A bonnet which has a tendency to rattle under the vibration of the motor can be readily silenced by piercing a series of holes in the band of metal on which the bonnet rests and threading through a strip of leather, as shown in illustration. The hood thus resting on leather and not against metal cannot possibly produce a noise. The improvement is so simple any automobilist can effect it.



BINDER TO PREVENT RATTLING.

External Causes Sometimes the Reason.

It may seem an anomalous statement to make, but from the incident given below it will be evident that causes within the motor itself are not always responsible for a failure to start or continue running. On the occasion in question, the motor invariably responded to cranking every time it was turned over on the compression stroke, sometimes taking up its cycle to the extent of making two, three, or even half a dozen complete revolutions, which should have been sufficient to show that it was in working order, but the true cause was never surmised. It is well known that the greatest drawback of the internal combustion motor of any type is its disability to start under load, and the reluctance of this particular motor to do its duty arose solely from the fact that it was unable to get up sufficient headway to overcome the resistance applied to it. The latter was finally located in a dragging band of the planetary change-speed gear and merely easing this off a bit righted matters at once.

This might seem to confine such cases to cars equipped with this type of change-speed gear, but a little reflection will suffice to show that this need not necessarily be the case. It is only the momentum of the flywheel that bridges the gap between the power strokes in the engine, but until it assumes a certain speed not enough power is stored in it to move the working parts sufficiently to bring about the next impulse. Naturally only a very light load is required to discourage the motor to this extent in its initial stages of starting, and it matters little how the load is applied. Under the head of external causes might also be included some defections as arise from the introduction of foreign bodies, usually in the gasoline, which cause a stoppage of the fuel supply, though this was not the intention in making this subdivision, as trouble of this nature really belongs to a description of carbureter ailments.

"CHOP IT IN TWO OR CUT YOUR WAY AROUND."

THREE-CYLINDER FERRYBOAT AT DEPOSIT, ALA.

HOW THE OLDSMOBILE "MUDLARK" FOUND THE WAY

By ONE OF THE TOURISTS.

ONE month ago the idea of autoing from Greater New York to the Gulf of Mexico was regarded as almost or quite impossible at any season of the year. As a winter cross-country run there appeared to the experts little likelihood of a successful finish to the project. In exactly three weeks after the start was made, however, Ralph R. Owen, of Cleveland, drove his famous 40-horsepower Oldsmobile *Mudlark* from Broadway, New York, to Canal street, New Orleans. The dream for a decade of enthusiastic autoists had come true. The feat had been accomplished in the face of weather and road conditions which seemed to willfully combine forces for the purpose of preventing a happy consummation of Mr. Owen's ambition.

When the *Mudlark* left Columbus Circle, New York City, early in the afternoon of Sunday, January 26, the streets of the metropolis were hidden beneath two feet of snow, and the route carried the tourists over the thick white carpet to Cleveland, nearly seven hundred miles away. Four days were consumed in negotiating this distance, and blizzards did their part in obstructing the progress of the hardy travelers. Six passengers in all braved the weather from New York to Albany, the first day's run, but at that point two returned to the allurements of Broadway.

A blizzard of snow, rain, sleet and a sixty-mile gale played an obligato to the purr of the motor throughout the second day, but at evening the tourists thawed out beside the radiators at Syracuse.

Tradition and railroad guide-books agree that beautiful scenery prevails along the Mohawk Valley, but the travelers saw none of it owing to the thick drop curtain of snowy whiteness which obstructed the view at a distance of ten feet in all directions.

On the third day, Tuesday, the car travel led to Buffalo in an encore of the previous day's storm, over roads which at that time were regarded as very bad, but which, in the light of later experiences, are recalled as boulevards.

Progress Through Ohio with the Thermometer at Zero.

Hurdling the hills to Ashtabula, O., was the next day's undertaking. Extreme cold and heavy fall of snow made the day's work a difficult one, but 150 miles were made between 11 o'clock in the morning and 8 at night. On Thursday a short and easy run was made to Cleveland, the home of two of the party, and most of the day was devoted to entertainment, rest and good wishes of friends. Snow lessened in depth rapidly as the car headed southward, and the first mud of the tour was encountered. Several miles of soft going were covered at a slow pace. The tourists hoped and believed in their innocence that nothing worse would be discovered in the south country, but were destined to take a post-graduate course in soil study later on.

The route wound its way through Bucyrus, Marion and Delaware, and aside from bitter cold weather the touring conditions were most favorable. Before reaching Columbus, however, a heavy cold rain began to fall, and as night had come on the party was glad to camp beside the steam heat at the Chittenden Hotel. Saturday morning brought another passenger, who was invited to go as far as he pleased. His evident intention was to travel about ten miles in the *Mudlark*, for he had absolutely no extra clothing, but it was eight days later and the car was ready to leave Huntsville, Ala., before he said "Good-bye" and turned back to the north. Rain prevailed during the day's run from Columbus to Cincinnati. The mercury hovered around the zero mark for the first time in years at Porkopolis while the tourists huddled close to the heating apparatus. Cold weather, in fact, was the chief discomfort of the northern portion of the tour, but later on the "troopers" gladly would have swapped the miserable roads of the South for the lowest temperature of the North.

Our Entry Into the Sunny South at Covington, Ky.

Early Sunday morning, with the thermometer registering but one degree above zero, the party hustled across the bridge of the Ohio river into the alleged "Sunny South." It was too cold to jest, however, and the roads were found to be good for several miles. Lexington, Kentucky, served lunch. Two hours were lost but not wasted in visiting the Haggin stock farm, where the *Mudlark* was photographed in a group with Salvitor, the famous old race horse, now twenty-one years of age. Two epochs of speed, the race horse and the automobile. Tire trouble, which had been spasmodic all the way from New York, now developed alarming symptoms, but the genuine epidemic did not break out until a day or two later. Then it raged in a high fever until New Orleans was reached, where with one gigantic explosion the trouble was over, for little remained but bare wheels. Fingering the cold tools and rebellious rubber while the mercury is below par is not conducive of buoyant disposition, but everybody forgave the rubber goods makers when the lights of Louisville loomed to leeward at supper time.

The *Mudlark* had now traveled 1,230 miles in a week of comparatively easy going, and with but 800 miles to cover the travelers gulled themselves into the belief that another week would register them at New Orleans. Poor, deluded

strangers in a stranger land! Tooling out of Louisville on Monday the car passed between a long funeral and a wagon loaded with caskets. Everybody denied the slightest trace of superstition, nevertheless four days were consumed in reaching Nashville, just a decent day's run southward. Part of the delay was due to the hospitality of the citizens of Bardstown, Ky., who persisted in showing us "The Old Kentucky Home," the birthplace of Abraham Lincoln, historic churches, and all the glories of the famous old township, including a liberal number of distilleries. During the second day from Louisville the highways were heavy and mountainous and progress slow. C. W. Thatcher's mule-team party of "good roads" promoters was overtaken, and a good roads club of 200 members was organized at Buffalo, Ky.

Bowling Green was reached at night, after many pictures of Mammoth Cave and other interesting places had been taken. A miracle marked the arrival at Bowling Green—a heavy snowstorm was astonishing the natives of southern Kentucky and all business was suspended in honor of the double event. Snow changed to rain in the night, the rivers burst their bans, and the car was stalled between streams for thirty hours at Portland, Tenn. A rescue party from Nashville attempted to meet us with a much-needed supply of tires, but likewise was stalled, and there was nothing to do but wait for the ebbing of the tide. At Nashville on the following day the tourists received further evidence of Southern hospitality, and were royally entertained at the Wautaugo Club. In this connection, it should be stated that a warm welcome was accorded the party at many Northern cities, notably Cincinnati, Columbus, Cleveland and Louisville. The kindest courtesy would have been a warm, clean bed, but the friends along the route enjoyed doing much more than was desired or expected. At Nashville, too, dire hints of bad roads were proffered, but caused little alarm. Was not the engine pulsing perfectly? Were not new tires plentiful, and the price at hand? Still, four days were relegated to the past tense before the beautiful streets of Birmingham were traversed.

A Striking Example of Southern Hospitality.

Huntsville, Ala., was the sleeping place on the first night, but it did not appear on the horizon until the moon rose at midnight. Meanwhile the tourists had forded streams which extinguished the lights and stopped the engine. Scouts waded the rivers with lanterns to find the road on the other side, while animals objected noisily to the intrusion of the woods. The pathway was a tomb with walls of thick pine timber in its natural state. Just beyond this point the travelers received the most memorable example of Southern hospitality of the entire voyage. Nine o'clock in the evening, with nothing to eat since early breakfast! A cup of coffee would offset the chill from the malaria-breeding marshes. A hut was in sight. Answering the knock came a woman who apparently had been unable to meet the atmospheric condition and beat them backward. Seven small children, gaunt and hungry-appearing, huddled around the inevitable Southern fireplace. Yes, certainly, she would make a pot of coffee. While the hostess prepared the hot drink an inventory of the two rooms was taken by the travelers, merely because everything was in plain view. Six dollars would have been an extravagant price for all the household effects in sight, including two broken banjos. Without a banjo no Alabama home is completely furnished. There may be no bed, but there must be a banjo. The coffee was accompanied by corncake. No sugar, milk or butter in evidence. Everything she had to offer was before the hungry ones. It was all the woman had to proffer, yet, in the face of abject poverty, the first sign of recompense was an insult to her. "No charge, sah," she said, and no price could be arranged. But the kids got $5.

Everywhere There Was Mud and Rain in Alabama.

The second Sunday found the *Mudlark* in the mountains and valleys of Alabama with a dreary, cold rain prevailing. Mud, like cement, prevented fast travel, and the one redeeming feature was the absence of horses on the alleged highways. In the South horses are not on neighing terms with the automobile, and fastest time can be made at night or early in the morning. During the day the passage is punctuated with continuous stops to lead horses past the car. Night found the travelers at a mountaineer's home, with supper of hog, hominy and hoe-cake. An attic room with rain beating merrily on the roof was not a bad place for sleep. On the following day enormous trees were discovered directly across the only road down the mountain and a private path was carved through the thicket, without asking permission of the owner, who might have been a thousand miles away. Twenty-five miles from Birmingham a swollen creek swallowed the car and passengers. Block and tackle pulled the car out of the bath. The motor refused to balk, and twenty-one miles of the best road in the country were quickly dispatched. We were in Birmingham, the most wonderful city in America for its population. At this city all brands of advice could be obtained free, but as a choice of evils the party determined to try the road direct to Meridian, Miss. Then came the deluge. Mud, deep water, and more mud. The valley is a chamber of horrors. Twenty-five miles of good roads as a teaser, then a plunge into red mud so sticky that it cannot be thrown from a shovel. At one point the car was pulled down hill on a 25 per cent. grade, using block and tackle. Somebody had told us that Meridian could be reached in a single day. The *Mudlark* raced (?) into Tuskaloosa, Ala., that night, less than a third of the distance to Meridian.

On the following morning a start was made very early, but

FAIR TYPE OF MISSISSIPPI ROAD NEAR HATTIESBURG.

NEAR TUSCALOOSA, ALA.—WHICH ROUTE FOR LEAST MUD?

after eighteen hours of continuous travel the car stopped at Eutaw, thirty-five miles away. This may be a reverse English record for American touring. During this day the block and tackle were used twenty-two times and negro guides showed the way along forest paths through plantations. From Eutaw to Meridian, Miss., the only change in road conditions is in the color of the mud. The color scheme changes from red to black, but the clinging qualities of one is equal to the other. At Meridian rains fell in a group, trains were stalled in all directions, telegraph wires were down, and prospects were poor for immediate progress. Within a few hours, however, the sandy soil of that section absorbed the water, and, after reconnoitering for several miles in many directions, it was decided to head for New Orleans by the most direct route and take chances. The Crescent City is but a decent day's journey, according to motorists' measurements, but under the conditions we occupied two full days and nights.

New Orleans Accorded the Tourists Generous Welcome.

The welcome accorded the tourists at New Orleans was worth all the weariness of travel, however, and everybody in the city seemed to have been watching the progress of the car

"MUDLARK" NO. 3 ARRIVES AT NEW ORLEANS.

from New York. The car and its intrepid driver, Ralph R. Owen, were cheered by crowds which blocked the streets, and only the police seemed unfriendly. "Move on" was the constant order, but the tourists had been doing that for exactly three weeks and it was easy to satisfy all concerned. A tour of the entire city was made, the *Mudlark* leading a parade of Oldsmobiles through parks, boulevards and alleys, which in New Orleans pass for streets. Monday, February 17, the tourists were royally entertained at clubs and hotels and in the evening immediately returned to the North. That the car reached New Orleans from New York with the motor putting softly and steadily as when it left the metropolis, speaks well for the development of the American automobile. The trip which was presumed to be impossible has been accomplished, and in the belief of the travelers, particularly Mr. Owen, who has made many American tours, would be a splendid route for the Glidden tour. Not impossible, but likely to eliminate nearly all perfect scores.

THREE RACES ON TARGA FLORIO COURSE.

PARIS, Feb. 17.—Three distinct races will be held in connection with the Targa Florio, May 7 to 10. Powerful touring machines will be provided for in 5.1 bore class; medium powered cars must not exceed 4.1 inches bore, where four cylinders are employed; voiturettes will be limited to 3.9 inches bore for a single cylinder. In addition to the Targa and the King of Italy's cup, $3,000 in gold will be given to the winner. The first prize in the voiturette race is $800.

THE AUTOMOBILE CALENDAR.

AMERICAN.

Shows and Meetings.

Mar. 7-14.....—Boston, Mechanics' Building and Horticultural Hall, Boston Automobile Dealers' Association. Chester I. Campbell, manager, 5 Park Square.
Mar. 11.....—Boston, Bay State Auto Association Clubhouse, First Quarterly Meeting, Society of Automobile Engineers.
Mar. 9-14.....—Buffalo, Convention Hall, Sixth Annual Automobile Show, Automobile Club of Buffalo. Dal H. Lewis, manager.
Mar. 16-21.....—Indianapolis, Ind., Annual Show, Automobile Dealers' Association.
Mar. 18-21.....—Rochester, N. Y., New Convention Hall, First Annual Show, Automobile Dealers' Association and Rochester Automobile Club. Bert Van Tuyle, manager.
Mar. 18-24.....—New Haven, Conn., Music Hall, Annual Show, New Haven Automobile Dealers' Association.
Mar. 21-28.....—Toronto, Canada, St. Lawrence Arena, Automobile Show. R. M. Jaffray, manager.
Apr. 5-12.....—Montreal, Canada, Arena, Third Annual Automobile and Sportsman's Show. R. M. Jaffray, Mgr.
April 6-8.....—Denver, Mammoth Rink, Annual Automobile Show. G. A. Wahlgreen, manager.

Race Meets, Hill Climbs, Etc.

Mar. 2-7.....—Ormond-Daytona, Fla., Automobile Club of America.
Mar. 18-19.....—Savannah, Ga., Savannah Automobile Club.
Apr. 24.....—Briarcliff Trophy Race, Westchester County, N. Y. Robert L. Morrell, chairman.
May 4-5.....—Harrisburg-Philadelphia and Return, 150-mile Endurance Run, Motor Club of Harrisburg.
May 15.....—Chicago, Algonquin Hill Climb, Chicago Motor Club.
May 16.....—Hartford, Conn., 200-mile Endurance Run, Automobile Club of Hartford.
May 30.....—Bridgeport, Conn., Sport Hill Climb, Bridgeport Automobile Club.
June 24-27.....—Chicago, 1,200-mile Reliability Run, Chicago Motor Club.
Sept. 14.....—Chicago, Annual Economy Run, Chicago Motor Club.

FOREIGN.

Shows.

Mar. 21-28.....—London, Agricultural Hall, Cordingley's Show.
Mar. 26-April 4.—London, Olympia Industrial Vehicle and Motor Boat Show.
May 17-June 2..—Moscow, Russia, International Automobile Exposition, Automobile Club of Moscow.

Race Meets, Hill Climbs, Etc.

April 1-13.....—Monaco Motor Boat Races and Motor Boat Exhibition, International Sporting Club of Monaco.
April 25-May 25—Industrial Vehicle Competition, Automobile Club of France.
May.....—Paris, Competition for Agricultural Automobiles, auspices of "L'Auto." (Date to be announced.)
May 1-31.....—Automobile Taxicab Competition, France, Automobile Club of France.
May 10.....—Sicily, Targa Florio, Automobile Club of Italy.
June 1-18.....—Reliability Trials for Pleasure Cars, Automobile Club of Great Britain.
June 9-17.....—Touring Competition for the Prince Henry of Prussia Prize, Germany, Imperial Automobile Club of Germany.
July 6.....—Voiturette Grand Prix, Dieppe Circuit (Automobile Club of France.)
July 7.....—Grand Prix of Automobile Club of France, Dieppe Circuit.
July 13-17.....—Ostend, Belgium, International Race Week, Automobile Club of Ostend.
July 20-30.....—Ardennes Circuit Races and Coupe de Liederke, Automobile Club of Belgium.
Aug.....—France, Coupe de la Presse, Automobile Club of France. (Exact date to be announced.)
Aug. 29-30.....—France, Mont Ventoux Hill Climb, Vaucluse Automobile Club.
Sept. 1-8.....—French Voiturette Contest, auspices of "L'Auto."
Oct.....—Berlin, Germany, Gordon-Bennett Balloon Race, Aeronautical Club of Berlin.

A SCHOOLBOY'S ESSAY ON THE AUTOMOBILE.

Topeka, Kan., has a ten-year-old hopeful whose father sternly refuses to help him with his lessons or debates. His name is Wendell Switzer, and he attends the Harrison School in that City. That the youngster is not sadly in need of coaching is evident from the argument he put up the other day in the school debate upon the momentous question, Resolved, "That automobiles are more useful to man than horses." His support of the affirmative side of the question is so original and unique that the same is worth publication in full. It is as follows:

First, I will mention that automobiles will run longer than horses. An automobile does not give you nearly as much trouble as horses. Very early in the morning you have to get up, dress, and go out in the cold and feed your horses, which is not at all nice, and then you have to wait a long time till they are through eating, which delays you; while an automobile you just have to fill with gasoline the minute you want to start. The feed for the automobile, which is gasoline, does not cost as much as feed for the horses, for the only feed there is for automobiles is gasoline, and the horse has to have corn, wheat, oats, hay, bran and other things, which raise higher and lower, but gasoline never changes its price much at all. And wheat is so valuable, and so is timothy hay, and you hardly ever get good wheat and corn. You have to take such good care of your corn or the crows will get it. And another thing is, that a horse can have only one horsepower, while an automobile can have forty or fifty.

If you do not give your horses good food, you cannot sell them for a good price, for they get weak and sick. Automobiles never get sick, which saves trouble. When a horse gets sick it is more liable to die than any other thing. You can get automobiles of all sizes, while horses are nearly all one size. You have to curry your horses, brush and wash them, which takes trouble. One of the hardest things of all about horses is training. That is very hard. Automobiles don't have to be trained, which saves trouble. To train a horse you must nearly risk your life, for you do not know what or when the colt is going to do. It is a very hard job. When a colt is first bridled up it does not know what to do. It jumps and rears, kicks, runs, and if you hitch one up to a new buggy, there will be nothing left of it, for the colt will do everything it can to get the harness off. The young colt is not used to having harness on, and it feels very miserable to him and he wants to get it off. The horses scare at street cars and rear up and sometimes break the buggy. Automobiles never get scared like horses. You have to hollow at the horse to make it go, while you just have to turn a crank to make an automobile go. An automobile tells us how far it has gone, or going, and how much gasoline it is using. A horse does not do that. It does not tell us how much flesh he is wearing off or how much breath it is using and don't tell us how far he is going, so we don't know when to stop and keep on going and wearing off flesh till the poor horse is nothing but skin and bones, which we call a skater, and make fun of the owner. Some people do not feed their horses, and drive them so much that they drive them to death. You can't run an automobile to death no matter how much you run them, which is better.

THE VOLUNTEER AUTO CORPS HAS COME.

PHILADELPHIA, Feb. 24.—Recognizing the feasibility of a volunteer automobile corps in time of emergency for the quick transportation of police or soldiers to scenes of disturbance, the Quaker City Motor Club has taken the initiative, and at its meeting last Thursday evening organized the First Volunteer Motor Corps, after adopting the following preamble and resolutions:

Preamble: Whereas, the American automobile has thoroughly demonstrated its utility and reliability as a vehicle of rapid transit; and,

Whereas, American motor car manufacturers have reached an almost perfect standard of construction; and,

Whereas, the march of progress demands both speed and endurance for all common carriers; and,

Whereas, the automobile is the practical forerunner of advancing civilization;

Now we, the Quaker City Motor Club, do hereby propose to enlist and enroll from among our members in good standing a sufficient number of capable and able-bodied men who shall agree to act as a volunteer motor corps.

This volunteer motor corps is to offer its services and machines, through the Quaker City Motor Club, free to the city of Philadelphia, the State of Pennsylvania and the United States government as an auxiliary force, in all cases of urgent need or dire necessity for the suppression of lawlessness and insurrection, or in the grave duty of repulsing foreign invasion in time of war. And,

Whereas, the Quaker City Motor Club is only actuated by true patriotism and love of country, we most humbly pray your best consideration and prompt acceptance of this sincere proposal.

Ratified and adopted February 20, 1908.

The offer of the motor corps' services, it will be noticed, was extended to include not only the city, but the State and the United States as well, as identical letters making the offer have been sent to the President, the Governor and the Mayor.

Among the other business of importance transacted at the meeting was the decision to change the club's quarters from the Majestic to the Walton. Three large second-floor rooms have been secured on the Locust street front of the hotel, and on special occasions additional adjoining rooms will be placed at the disposal of the club. The first meeting in the new quarters will be held Thursday, March 5, when a "house opening" will be in order.

KANSAS CITY CLUB BOOMING GOOD ROADS.

KANSAS CITY, MO., Feb. 24.—So pronounced was the success of the Good Roads banquet, held January 15, that the members of the club are enthusiastic over continuing the work, and will hold a smoker at the Savoy Hotel, March 12.

OMNIBUSES FOR THE QUARTERMASTER'S DEPARTMENT, U. S. A., TO BE USED AT THE WEST POINT MILITARY ACADEMY.

The three cars represents one day's shipment from the factory ot the makers, the Auto-Car Equipment Company, of Buffalo, N. Y. The cars are fitted up in an especially attractive manner, the upholstering being of hand-buffed leather, the windows, plate glass in mahogany frames, electric lights and lamps, electric signals, etc. Motor equipment is two Westinghouse vehicle motors, with 42-cell National Storage batteries, and the tires Diamond wire mesh base applied with side flanges of 36-inch diameter. In the daily operation they have to overcome a grade of 12 per cent. in a thousand feet.

THE AUTOMOBILE

Vol. XVIII Thursday, February 27, 1908 No. 9

THE CLASS JOURNAL COMPANY
Flatiron Building, Madison Square
New York City

H. M. SWETLAND, President

EDITORIAL DEPARTMENT
A. G. BATCHELDER, Managing Editor
R. F. KELSEY Associate Editor C. B. HAYWARD, Engineering Editor
W. F. BRADLEY

BUSINESS DEPARTMENT
A. B. SWETLAND, Business Manager
LOUIS R. SMITH FRANK B. BARNETT
W. I. RALPH, 1035 Old South Building, Boston, Mass.
C. H. GURNETT, H. E. WESTERDALE, 836 Monadnock Block, Chicago, Ill.

Cable Address - - - - - - - - - - - - - - - Autoland, New York
Long Distance Telephone - - - - - - - - - - 300 Gramercy, New York

SUBSCRIPTION RATES:
United States and Mexico - - - - - - - - - - - - One Year, $3.00
Other Countries in Postal Union, including Canada, - - - One Year, 5.00
To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order, or Register your letter.

FOREIGN SUBSCRIPTION AGENTS:
ENGLAND:—Illiffe & Sons, Limited, 29 Tudor Street, London, E. C.
FRANCE:—Boyveau & Chevillet, 22 Rue de la Banque, Paris.
GERMANY:—A. Seydel Mohrenstrasse 9, Berlin.

Entered at New York, N. Y., as second-class matter.

The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907.

Copies printed in 1905 - - - - - - - - - - - - - 730,000
" " in 1906 - - - - - - - - - - - - - 791,000
" " in 1907 - - - - - - - - - - - - - 888,900

A NATIONAL BODY OF STATE ASSOCIATIONS.

Only through the combined efforts of local automobilists can acceptable local conditions be secured; only through the united endeavors of the automobilists of a State can reasonable State laws be assured; and only through the welding together into a national body of these State associations can the general good of automobiling be furthered and the day brought nearer when anything savoring of unjustness and oppression shall be improbable and impossible.

With a Federal Registration bill pending at Washington, and unusual and varied activities rampant in various States, the need of organization is apparent to all automobilists. No one club can be made powerful enough to encompass the needs of the diversified situation, and this opinion was that of the clubs which assembled at Chicago, March 4, 1902, and formed the American Automobile Association. The years that have passed since then have only confirmed this judgment in a country where centralized direction arouses determined disputation. Any attempt to establish a club autocracy would meet with a unanimous opposition and would do no good to that club which sought to assume the dictatorship of automobiling in this country.

A club is entitled to the right of way in its district as long as it conserves the rights of those whom it assumes to protect, and only when it is derelict in its duty has the parent body any reason to invade club precincts. But the automobilists of a city have a right to expect that the local club shall do all that it can to preserve the unfettered and uninterrupted use of the motor-driven vehicle. No injustice should be borne without protest.

This country is one of magnificent distances, but when the era of road-building has fairly gotten into its stride—and it is starting in a most convincing matter—the automobile will shorten mileage as easily as is the case in older Europe with its countries wherein highways deserve the name. Coincident with the making of the roads will be the enlarged capacity of supplying touring information, and certainly this cannot be better accomplished than by the accumulating and disseminating work of a national body of State associations comprising local clubs and individual members in districts where clubs do not exist. Even now a member of the A. A. A. can, without extra expense, obtain special information upon application to the association's Touring Board, and the mass of material which has been and is being prepared by clubs and members scattered throughout the country insures the perfection of a bureau which will increase in value and make it superior to any other source of similar information available to all autoists and at moderate cost.

The good of automobiling requires a national organization which shall be such in reality and not alone in name. Judging from the astounding progress of the Hotchkiss-Hower-Thompson-Terry-Hooper-Van Sicklen-Elliott administration, the work of the A. A. A. is only in its beginning, for even the friends and well-wishers of the organization are forced to admit that it has been somewhat erratic in getting into its high speed. Mistakes it has made, and mistakes it will make in the future, but its accomplishments will be exactly what are made possible by the support of the growing army of automobilists. It is a habit of American citizenship as a whole to let the other fellow do the work, unless the discomforts of the situation visit themselves directly upon us, and it must be said that many automobilists withhold financial as well as moral support to those working for their interests. But with over 20,000 already enrolled, and the list growing every week, the A. A. A. should have 50,000 members before the year concludes.

* * *

THE PRACTICE OF "DOPING" A MOTOR.

It is a matter of common knowledge that one of the practices of horse racing has been extended to automobile racing, and this is the employment of various substances to make a motor produce far more than its rated power by means which may be compared to what is known as "doping" a horse. Crude methods of doing this involved nothing more than the mixture of some powerful agent, such as picric acid, directly with the gasoline, but more recently science has been called into play and accurately measured doses of oxygen administered.

As a matter of scientific interest, such experiments are of considerable value, as they tend to demonstrate that the internal-combustion motor is far from having reached the end of its great possibilities. On the other hand, they seem to have had an unfortunate influence on many an amateur autoist, who is anxious to try the effects of picric acid, oxygen and acetylene gas for himself. No one who uses horses for his own pleasure would think of following race track practices to get a little more speed out of them, so that it seems strange that so many autoists should wish to learn how to do this to their motors.

GEORGIA'S GOVERNOR TO PRESENT SAVANNAH TROPHIES

SAVANNAH, GA., Feb. 24.—The general executive committee of the March 18 and 19 races have arranged the program of the meet. A feature will be the presentation of the trophies by Governor Hoke Smith, who showed his interest in the races by the offer to call out the military to police the course, which offer was as promptly accepted.

The program decided includes for Tuesday, March 17, at 4 P. M., a parade of the officials in touring cars and the contesting automobiles. Wednesday, March 18, there will be the two 180-mile races. The runabout event will begin at 11 A. M. At 3 o'clock, what has been known as the "six-cylinder cup race," but to which are now to be admitted cars having a piston displacement of more than 575 cubic inches, will be started. Thursday, March 19, will be the big race for the Savannah trophy, start being at 12 o'clock.

At 8 o'clock in the evening Governor Smith will present the trophies at the De Soto Hotel. The challenge trophy will be a silver cup set upon an ebony base, the whole being 27 inches tall. The design is the workmanship of S. E. Theus. The other two prizes are the work of R. Van Keuren. These cups, while smaller than the challenge trophy, have attracted high praise. The challenge trophy is a Grecian shaped two-handled cup. An oval frame containing the picture of Oglethorpe is the central engraving. Beneath the picture is a shield with "Governor Oglethorpe" and a date upon it. Supporting the frame are palm branches and live oak covered with Spanish moss, all in bold relief. On one side of the frame is an Indian scene representing life about Savannah in 1733. In unusual contrast is the scene on the other side of the central engraving. Here are shown automobiles of latest design at racing speed, with the date "1908." The convoluted stem of the cup has alanthus leaves in relief. The base is Corinthian. The ebony pedestal is octagonal in shape. Cotton bales surround it, affording room for the inscription of the names of the successive winners of the cup. The trophy is to cost $1,800. Each of the cups designed by Mr. Van Keuren is to cost $1,000.

Each of the winning drivers will be presented with a bronze medal. These will have a facsimile of the coat of arms of Savannah and a suitable inscription.

N. H. Van Sicklen, chairman of the Technical Board of the A. A. A., is expected to arrive in Savannah within the next few days to assist the local committee.

Mayor Tiedeman and the City Council have gone further than promised and declared both days holidays.

J. H. Andrews, Mineola, N. Y., of the firm which oiled the Vanderbilt Cup course on Long Island, has just left the city after inspecting the roads composing the course. He made a proposition to the committee having charge of the preparation of the roads which will probably be accepted. After looking over the course, Mr. Andrews said of it: "The course is much better than the Vanderbilt Cup course on Long Island. More than every mile of this course is better than any mile of the Vanderbilt course. They are raving about the scenery of this course up North, but the road is better than the scenery."

SAVANNAH AND ST. LOUIS WANT VANDERBILT CUP RACE

AT the meeting of the A. A. A. Racing Board, held Monday last at the association's headquarters, 437 Fifth avenue, New York City, it developed that both Savannah, Ga., and St. Louis, Mo., are substantial seekers for the honor of supplying a course for the 1908 Vanderbilt Cup race in case it is found advisable to hold the event elsewhere than as usual on Long Island. Chairman Jefferson deMont Thompson, who presided at the session, was empowered to investigate the proposition from Georgia and Missouri.

Present at the session besides Chairman Thompson were William K. Vanderbilt, Jr., donor of the famous cup; A. R. Pardington, general manager of the Long Island Motor Parkway; S. A. Miles, general manager of the National Association of Automobile Manufacturers; Alfred Reeves, general manager of the American Motor Car Manufacturers' Association; A. L. Riker, Bridgeport; E. R. Thomas, Buffalo; H. R. Worthington, A. G. Batchelder and Secretary F. H. Elliott.

Various subjects discussed were referred to sub-committees for disposition. The report of the rules committee, consisting of Chairman Thompson and Messrs. Miles, Riker and Reeves, occupied several hours, and it was decided to send the final draft to the board members for immediate consideration and concluding suggestions.

While nothing definite has been announced regarding the amateur definition, the rule has been thus modified:

A man who has never driven or raced a motor car for pay, either in cash or any other valuable consideration; or competed for a cash prize; who does not make his livelihood or any part of it, as a result of racing or driving, either as a demonstrator, tester, or chauffeur; who has not otherwise received financial reward for engaging in competition; who has never been declared a professional by any sport-governing body, or who, having been so declared, has been reinstated either by such body or by the A. A. A. Racing Board.

Of course, it is still possible to hold special events limited only to those specifically desired in them, but for the purpose of open competition the new rule should be found much more satisfactory than the former one.

A. A. A. TO FIGHT NEW YORK TIRE CHAIN ORDINANCE

AFTER having thoroughly investigated the status of the ordinance recently adopted by the New York Park Board, prohibiting the use of tire chains on cars entering any of the city parks, the American Automobile Association has decided to make a test case with a view to having the ordinance declared unconstitutional, and to that effect has just issued an announcement offering to defend any of its members who may be arrested for a violation of the said ordinance. The announcement will be interesting to autoists of other cities, where similar ordinances may be attempted.

To Members of the American Automobile Association:

Any member of the American Automobile Association arrested for alleged violation of the recently re-enacted ordinance by the Park Board of the City of New York, prohibiting automobiles wearing tire chains, upon due notification to the office of the Association, 437 Fifth avenue, or to Charles Thaddeus Terry, Counsel for the American Automobile Association, 100 Broadway, New York, by person so arrested, the Association will be willing to defend the person or persons so arrested, without expense to him or them, in such a number of cases as may be adequate to test the validity and frugality of such ordinance.

F. H. ELLIOTT, Secretary.

AGENCY SUIT DECIDED AGAINST A. L. A. M.

In the action brought by the Association of Licensed Automobile Manufacturers to punish Walter C. Allen for contempt for having disobeyed an injunction obtained against him some time ago, Judge Holt, sitting in the U. S. Circuit Court for the Southern District of New York, has just decided in favor of the defendant. Mr. Allen was associated with the Dietrich Import Company, and is now one of the builders of the Allen-Kingston car. When he gave up his Dietrich "Licensed" connection and undertook the sale of the Allen-Kingston car, it was a violation of his agency agreement, according to the Licensed Association, which promptly obtained an injunction against him. Mr. Allen did not defend the application for an injunction, nor did he pay any attention to it when obtained, for which reason the association made a motion to have him punished for contempt of court. Judge Holt reviewed the situation at length, and his decision, though on an entirely collateral issue, is considered of importance in Selden matters. He said in part:

If, therefore, the Allen-Kingston automobile is obviously, upon mere inspection, an infringement of the Selden patent, the motion to punish him for contempt in offering to sell it should be granted. The question whether it is obviously an infringement seems to me to depend upon the question whether the Selden patent is a pioneer patent or not.

If the Selden patent conveyed to the patentee a monopoly, in this country, of the right to make and sell any gasoline automobile of the usual types, then I think that the points of distinction alleged in the affidavit of Mr. Smith are immaterial, but if the Selden patent is not a pioneer patent covering the entire fundamental principle of the gasoline automobile, but simply is a patent for a particular kind of a gasoline automobile, I think it at least doubtful, in view of the grounds of distinction pointed out by Mr. Smith, whether the Allen-Kingston automobile infringes.

It is claimed that the opinion of Judge Coxe shows that he held the Selden patent to be a pioneer patent, and its language, at first reading, seems to tend to sustain that claim; but I think that the opinion of Judge Coxe should be read in the light of the real question before him, and I cannot see how the question of the absolute validity or invalidity of a patent can be determined upon a demurrer which is based simply upon the claim that the patent is void on its face. If the patent shows on its face that it is void, that fact may be determined upon a demurrer; but it seems to me that a decision upon such a demurrer upholding a patent cannot be conclusive on any defense which depends on extraneous proof, as, for instance, anticipation by earlier patents, or by inventions described in earlier publications, or by prior use, or any of the many defenses which may be set up to the validity of a patent which are not apparent on its face. I therefore cannot see how the decision of Judge Coxe upon the demurrer establishes conclusively that this patent is either a pioneer patent, or is valid, and admittedly there has been no decision rendered after a hearing upon the merits on proofs taken. Moreover, there are facts in this case which support the suggestion that the complainants have hesitated to bring such a question to actual decision.

The patent was applied for in 1879. It was granted sixteen years later, in 1895. Nearly thirteen years have since passed, during which the complainants have asserted that they had a pioneer patent, and have caused many persons to take out licenses from them, and have collected, according to the motion papers, about $1,500,000 for license fees, without bringing to actual trial a case testing the question of the validity of this patent on the merits. Several such cases have been brought. One was a case against the Winton Carriage Company, in which the complainants took their prima facie proofs, and the defendant had nearly completed its proofs, when the case was compromised, and settled out of court. As early as 1903 suits were brought by the complainants against the Ford Motor Company and the O. J. Gude Company, for the infringement of the Selden patent, and as early as 1906 suits were brought by the complainants against the Panhard Company. In all these suits defenses were interposed on the merits, but the testimony never has been completed, and the cases never brought to a hearing.

The claim put forth upon this motion is that the Selden patent is a pioneer patent, and that all makers of gasoline automobiles of the usual types infringe the patent. So serious a claim as this ought not to be upheld by the courts unless the complainants either have established the validity of the patents in a contested litigation, or have been ready to do so without delay whenever an opportunity has been offered.

If this motion is granted, it will be urged, as the decision of Judge Coxe on the demurrer has been urged, as an adjudication that the Selden patent is a pioneer patent, and that all makers of gasoline automobiles must have a license. I think, on the papers submitted, that there is sufficient doubt whether the Selden patent is a pioneer patent, and that, if it is not a pioneer patent, there is sufficient doubt whether the Allen-Kingston automobile infringes, to make it improper to grant this motion.

My conclusion, therefore, is that the motion to punish the defendants for contempt should be denied.

February 15, 1908.

The counsel for the Association of Licensed Automobile Manufacturers were Betts, Sheffield, Bentley and Betts (Samuel R. Betts, William A. Redding), and James J. Cosgrove, of counsel, while the lawyers for the defendants were the firm of Nathan Bijur and George H. Engelhard, with R. A. Parker, of counsel.

ALBANY'S AUTO LEGISLATIVE GRIST.

ALBANY, N. Y., Feb. 24.—During the past week motor vehicle legislation was one of the foremost topics considered by the legislators. There was a hearing before the general laws committee on all the bills before that committee, at which Attorney Charles T. Terry appeared for the A. A. A. Legislative Board, and Attorney M. Bender of Albany for the State association. They argued against the Donihee bill to require a special form of auto lamp which should be so shaded as to prevent the escape of any upward rays and against the Northrup bill to tax auto owners $5 each as a sort of road tax in addition to the registration fee. Neither bill was reported.

But the Weimert bill, to give garage keepers a lien on motor vehicles cared for when the owners fail to pay bills for keep, repairs, or supplies, was not objected to and, after being perfected by a slight amendment to include gasoline in the supplies, was reported for reprinting and to take its place on second reading.

The Wainwright bill, authorizing boards of supervisors to enact laws requiring all vehicles using the highways at nights to display lights, if not already so required by other laws, will be given a hearing Tuesday by the Assembly internal affairs committee.

Other bills introduced are the Eagleton bill, to prohibit the use of any motor vehicle of more than 20 horsepower for other than speed tests and races; Eagleton's bill to give persons injured by a motor vehicle a lien on the vehicle for the amount of the judgment secured by reason of such injury; the A. E. Smith bill, to tax motor vehicles according to their seating capacities, and Senator Grady's bill, for the protection of persons on highways, which seeks to provide that "All lawfully disposed persons have an equal right to be upon, use and traverse the public highways, roads, streets, avenues and places in this State, and no person has a right to drive or ride thereon at a rate of speed dangerous to others.

There will be a hearing on Wednesday of this week before the Assembly general laws committee on the Yale bill to repeal that section of the motor vehicle law which now permits supervisors and other local authorities to set aside a portion of the highway for auto races. Attorney Terry was ready to argue on the bill last week, but Mr. Yale had arranged to put it over a week, and said then he would bring up a delegation to favor the bill. It is understood that a delegation of Long Islanders, headed by Congressman Cocks, will appear to favor it, with certain persons from Westchester and Putnam counties.

MARCH MEETING OF THE A. S. M. E.

The March meeting of the American Society of Mechanical Engineers will be held on Tuesday evening, March 10, in the Engineering Societies building. The meeting will be addressed by Dr. Charles P. Steinmetz, who is a member of the A. S. M. E. and a past president of the American Institute of Electrical Engineers. His subject will be "The Steam Path of the Steam Turbine."

NEW JERSEY IS HAVING A SUCCESSFUL SHOW

NEWARK, N. J., Feb. 26.—Though so crowded for space that almost every dealer was reduced to exhibiting but one model of any make, Newark's first automobile show in the Electric Park auditorium had all the features that make for popularity and success. When Mayor Haussling, of Newark, and Mayor Shoenthal, of Orange, pronounced the official opening speeches on Friday evening, February 21, the auditorium was a tastefully decorated hall of white and gold, with every car in its place and so crowded with spectators as to prove conclusively that the New Jersey Automobile and Motor Club and the New Jersey Automobile Trade Association would have been justified in securing a larger hall had one been available. Mayor Cardwell, of East Orange, who had arranged to be present at the opening ceremony, missed the White steamer sent to bring him to the auditorium, with the result that he was compelled to board the trolley car and enter the hall later in the evening. At that time the crowd was so great that the management had serious thoughts of closing the doors. In addition to the three mayors, a strong force of city officials and prominent automobilists attended on the opening night, the total attendance for that evening being 5,000, according to official figures. Though slightly less on the succeeding evenings, there was never anything approaching a dearth of visitors, and according to the reports of exhibiting dealers business is always of a satisfactory nature.

Tuesday evening being "Club night," delegations from Englewood, Paterson, New Brunswick, Plainfield, Trenton, Camden, Cape May, Jersey City and other points filled the hall with well-known automobilists and leaders of the clubs and associations in the New Jersey and the Metropolitan district. Though many of the clubmen arrived in their own automobiles from distant points, there was no difficulty in housing the cars, the grounds surrounding the auditorium forming an excellent open-air garage. Society is to have its exclusive innings Thursday night.

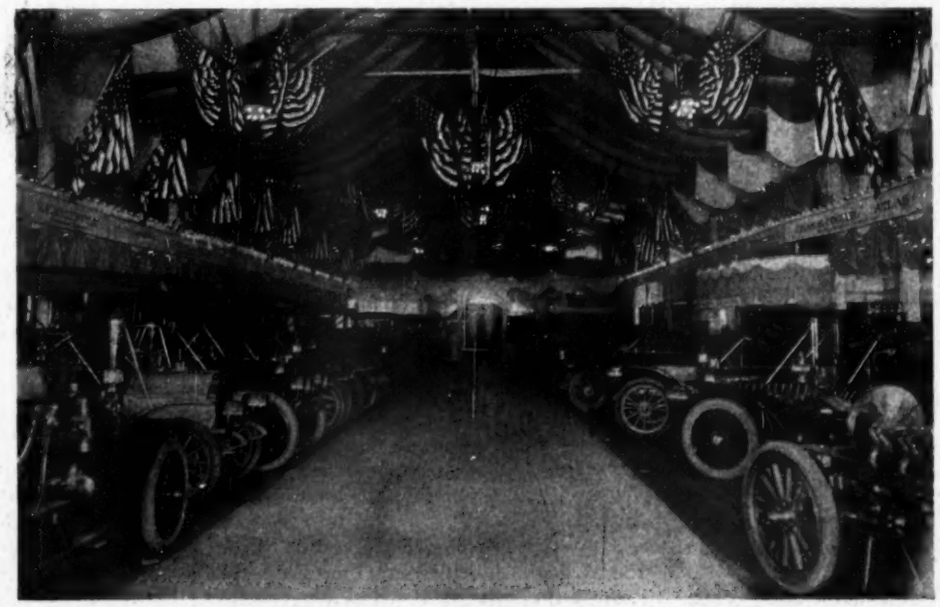
ELECTRIC PARK AUDITORIUM, WHERE NEWARK HELD ITS FIRST AUTO SHOW.

As a stimulator of interest in automobiling and an aid to spring buying, the Newark eight-day show came up to all expectations. Between the few who thought the venture too modest and the still smaller number deprecating any exhibition, there was a solid group of dealers who realized that a late winter show would help along spring sales and stimulate activity generally, and they were in no way disappointed.

Prominent among the inside attractions is a cinematograph exhibition every evening at 9 o'clock, the moving pictures representing Vanderbilt Cup races and other automobile events being shown on a screen let down in the center of the hall and visible from both sides. A musical program is given afternoon and evening of each day.

As a convenience to residents in the Oranges and at the same time as an automobile demonstration, twelve White steamers carry passengers to the Electric Park at intervals of half an hour, from 2 to 11 P. M. Their starting points are the Brick Church and East Orange stations of the Lackawanna, and from Main and Day streets, Orange.

Thirty-one different makes of automobiles are exhibited by twenty-two dealers, the number of cars on exhibition being about fifty. In addition a full line of accessories are shown by all the more prominent local dealers. The car exhibitors



HOW THE CARS WERE STAGED IN A SETTING OF WHITE, GOLD AND NATIONAL FLAGS.

include practically all the important dealers of Newark and district, and are in quite a number of cases supported by some part of the staff from the factories they represent. The cars range from modest single-cylinder doctors' runabouts and equally modest buggyabouts to handsome six-cylinder automobiles with limousine body. The complete list of car exhibitors, with the cars they are showing, is as follows:

EXHIBITOR.	CAR.
A. G. Spalding & Bros.	Stevens-Duryea
Allen-Kingston Motor Car Co.	Allen-Kingston
Brush-McLaren Motor Co.	Brush and F. N. Motorcycle
Calvert-Zusi Co.	Winton
Carl Page Co.	Peerless
Chas. S. Cooper	Atlas
Ellis Motor Car Co.	Pierce Great Arrow and Knox
Essex Auto Co.	Jackson
Garford Motor Car Co.	Garford
Greene Motor Car Co.	Locomobile, Oldsmobile
H. J. Koehler	Buick and Waltham
Hygrade Motor Car Co.	Ford
J. W. Mason	Maxwell and Stoddard-Dayton
Mitchell Auto Co. of N. J.	Mitchell
Motor Car Co. of N. J.	Packard, Autocar, Cadillac, Northern
Osborne & Morton	Auburn
P. H. Johnston	Grout
Rickey Machine Co.	Marmon
Sheldon W. Case	Holsman
Star Motor Car Co.	Pullman and Napier
The White Company	White
W. S. Maltby	Corbin

The "New Jersey Automobile Exhibition" is the name of the definite company under whose auspices the show is being held, its make-up containing President Angus Sinclair, Secretary H. A. Bonnell, and ex-Presidents Joseph H. Wood and James R, English, of the Automobile Club, and R. A. Greene, J. W. Mason, and W. H. Ellis, from the Trade Association, with George Paddick, president of the Trade Association, also being president of the company. W. F. Kimber is legal adviser.

FRANKLIN MAKES A WINTER RECORD.

CINCINNATI, Feb. 24.—An eleven-day run over Ohio and Kentucky roads under rigorous non-stop conditions would be a creditable performance under any circumstances, but to demonstrate that the Franklin air-cooled car was equal to any conditions, no matter how bad, the Sid Black Automobile Company, Franklin agents in this city, started a Franklin 28-horsepower Model D car on a non-stop, mileage and economy test on February 11. On that day and the two following the car made successive trips to Columbus and return, the state of the roads being almost inconceivable as it was then at the close of a week's rain. Trips were also made to Lexington and Hamilton, Ky., during the most severe winter weather. Sid Black, C. A. Robinson, John Burns and V. Higgins took turns at the wheel, each handling the car for a six-hour shift, while two observers were carried at all times. At the conclusion of the test the engine had been running constantly for 11 days, or 264 hours, during which time the car had covered 2,152 miles.

N. Y. AUTO RACING OPPOSITION EXPIRES.

ALBANY, N. Y., Feb. 26.—The Yale bill to repeal the section of the Motor Vehicle law permitting road races is dead. The hearing to-day was adjourned indefinitely by the general laws committee. Charles T. Terry, A. R. Pardington, F. H. Elliott, M. T. Bender, O. A. Quayle and C. D. Hakes, of the American Automobile Association, were present to oppose the measure. Assemblyman Yale will abandon his bill.

The Bashford bill before the committee, amending the automobile law generally, is also dead.

The delegation here to-day also appeared before the codes committee in opposition to the McGrath bill to compel autoists to stop and wait to be arrested or be guilty of a misdemeanor.

A. A. A. DOES SAME WORK AT LOWER PRICE.

In view of the fact that clubs belonging to the A. A. A. only pay $1 per year per member, of which 75 cents goes to the State association and only 25 cents to the national body, and the annual fee for non-club members is only $2, it would seem that automobilists generally will continue to obtain their touring information, books, maps, etc., from the A. A. A. rather than make any grand rush to become "subscribers" of the bureau of tours of the A. C. A. at $10 per year. This is the comment of Arthur N. Jervis in the New York *Mail:*

"Considerable curiosity is cropping up as to the motive behind the new plan of the Automobile Club of America, which has just been announced. Although it is said that the club has no thought at present of forming a separate association, the decision to organize a floating membership into a sort of loosely affiliated or supplementary body on the lines of the Touring Club of France has suggested to some that the A. C. A. plans an organization to obtain, classify and dispense touring information after the methods in vogue in Europe. Such a body would necessarily be a rival in the field to the American Automobile Association, which now does this for its members, and at a much lower cost for membership than the $10 a year which the A. C. A. proposes to charge the subscribers to its 'bureau of tours.'

"The A. A. A. has a touring board that dispenses information about tours here or abroad free to its members. This work has been growing rapidly, and is now one of the most important branches of A. A. A. activity. It would take a long time for any other body to get a touring bureau organized in the fine working order that the A. A. A. has its department. The A. A. A. has the recognition of the foreign organizations, as well as the A. C. A., but a rivalry between the two would not contribute to the prestige of American automobilists going abroad."

SCRANTON WILL ENFORCE LAW ON SIGNS.

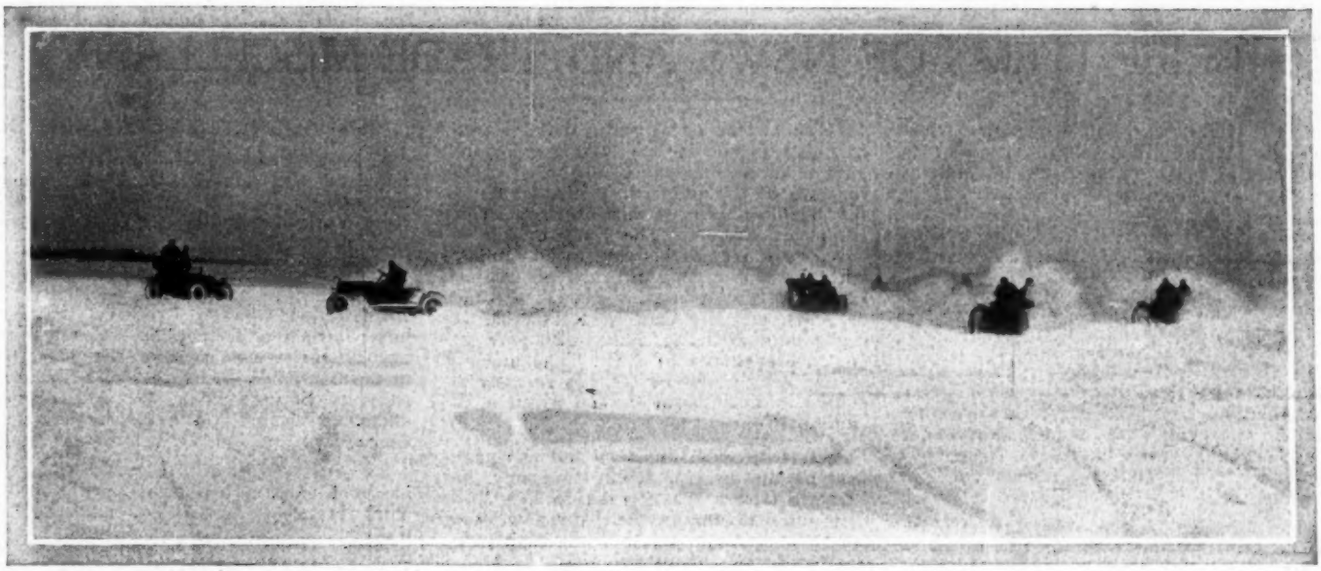
SCRANTON, PA., Feb. 24.—Through its attorney, Hugh B. Andrews, the Automobile Association of Scranton has served notice on the road supervisors and constables of Lackawanna county that the law dealing with sign boards and loose stones must be rigorously enforced. Under the act of June 18, 1886, the supervisors are compelled to erect sign posts at the intersection of all public roads within their respective townships, the penalty for neglect or refusal to do so after ten days' personal notice being $20 in each case. Under the act of July 2, 1901, Township supervisors and road commissioners are responsible for the removal of loose stones from the highways at least once a month during May, June, August and October. Penalty for neglect or refusal to carry out the provision of the act is $10, to be recovered by action of debt in the name of the Commonwealth.

FIRE WILL NOT DELAY STODDARD-DAYTON.

DAYTON, O., Feb. 26.—Last Friday morning, February 21, a destructive fire broke out in the trimming room of the Dayton Motor Car Company's big plant. The fourth floor of the new six-story concrete building was gutted, the fourth and fifth floors of the office building entirely destroyed, and the first three floors of the same building soaked with water.

When the fire had been subdued so that the fire department could control it, H. J. Edwards, chief engineer of the concern, with R. T. Houk, superintendent of the plant, were busy planning for the work of the morning. The moment the water was shut off, an army of workmen started the work of clearing away the debris, and while the fire engines were still on the scene letters were going out to the agents telling them to be of good cheer. J. W. Stoddard, president of the company, who does not know the meaning of the word defeat, was on the scene early and personally directed the reorganization and went home only after having given his instructions to the different departments.

On Monday morning, forty-eight hours after the fire, every man of the force was back at his work. Men who do things surround J. W. and C. G. Stoddard.



PACKARD TESTERS UTILIZING THE ICE-COVERED SURFACE OF LAKE ST. CLAIR—TURNING POINT IN IMPROMPTU RACE.

CAR TESTING ON SNOW-BLANKETED ST. CLAIR.

DETROIT, Feb. 24.—While the ice boats lay buried and frozen in the deep snow which covered Lake St. Clair from shore to shore and Detroit was snowbound, with its suburban traffic halted, limited passenger trains being dug out of drifts and freight trains abandoned, a dozen automobiles last week raced and chased through the unbroken drifts on the broad sheet of ice. As black specks on the horizon swept toward the shore, throwing a great cloud of snow high behind them, they became recognizable as a squadron of "Wild Bill" Birmingham's army of Packard testers, while the gray runabout, racing with Sales Manager Waldron's touring car, was piloted by Manager Joy. The Packard Motor Car Company had been for weeks using the old-fashioned winter to advantage in the testing of cars through snowdrifts and up and down icy, snow-shrouded hillsides. The administration, engineering and testing departments had been busy for days driving cars through the snow-clogged thoroughfares leading out of Detroit. The last heavy storm spread a thick blanket over the lake and made it an ideal place for fast running over a broken track, for plugging through drifts and for general and unhindered wintertime testing. Hence the immediate inauguration of Lake St. Clair as a new testing rendezvous by the Packard folks. The lake is so solidly frozen that it is possible to drive all over it, although on account of snow-covered cracks it is not safe to drive from shore to shore without a local guide who is familiar with the location of the dangerous places. The photograph shows an impromptu race between the testers at the point where one of the turns is made.

PACKARD MAY ACQUIRE HARTFORD PLANT.

HARTFORD, CONN., Feb. 24.— It is reported in automobile circles in this city that there is a likelihood of the plant of the defunct Electric Vehicle Company being acquired by the Packard Motor Car Company of Detroit. It is a matter of common knowledge that the sales of Packard cars in the East are very large, and it is rumored that the object of the company in taking over the plant in question would be to establish an Eastern department. It is also well known that the Packard Company suffered less during the recent financial stringency than the majority of its competitors and that it is in an excellent position to finance the acquisition of the Hartford plant, should this be deemed advisable. On this account the report is receiving considerable credence here.

RAPID COMPANY DECLARES DIVIDEND.

PONTIAC, MICH., Feb. 24.—That the automobile industry did not suffer to as great an extent as many of its detractors would have the world believe, is evident by the fact that the Rapid Motor Vehicle Company, of this city, has just declared a 10 per cent. dividend on its stock, having had a most prosperous year during 1907. The officers of the company are A. G. North, president; Max Grabowsky, vice-president; H. G. Hamilton, treasurer and manager, and Morris Grabowsky, secretary. All are confident that the coming twelvemonth will see a volume of business fully equal to, if not greater than, that of the past year. Orders are plentiful at the factory and a full quota of help is employed.

TIRE PRIZES FOR BRIARCLIFF DRIVERS.

Further stimulus to effort on the part of the drivers who will take part in the Briarcliff Trophy race, is to be found in the recently announced offer of the Diamond Rubber Company, of cash prizes for winners on cars equipped with Diamond tires. For the first, $500 is offered; second, $350, and third, $150. The specially trained tire crews of the Diamond company will be stationed along the course and will give their entire attention to the competing machines that are equipped with Diamond tires.

CADILLAC MODEL G AS MOTIVE POWER FOR SNOW PLOWS.

BRIEF ITEMS OF NEWS AND TRADE MISCELLANY

The Hume Carriage Company, which was established in Amesbury, Mass., in 1857, and which makes a specialty of building high-grade limousine, landaulette, touring and runabout bodies, demi-limousine and cape tops, has removed its entire factory to 66 Stanhope street, Boston.

The official record of automobiles registered in New York State for the months of October, November and December, 1907, shows that the Renault leads all the rest of the foreign makes. During these three months more Renault cars were registered than the five next highest foreign cars combined. For the week ending February 8 more Renault cars were registered in New York State than all other foreign cars put together.

The Ormond-Daytona (Fla.) race meet, to be held the first week in March, is receiving generous support from the Continental Caoutchouc Company, makers of Continental tires. One of the prizes offered is $200 in cash to the owner of the automobile winning the 300-mile race, provided, of course, the car is equipped with Continentals. Another offer relates to the 100-mile event, for which a special prize of $100 is offered to the owner of the winning car, under the same conditions.

Everybody interested in the actual cost of running a high-grade car will have facts and figures to guide them when the Winton Company publishes the result of its $2,500 contest for Six-Teen-Six drivers. The rules of the contest require monthly reports from all contestants and the figures are being compiled for public distribution as soon as the awards are announced. Any employed driver of a Six-Teen-Six is eligible to enter the contest. There are ten individual prizes ranging from $100 up to $1,000 in gold coin.

An increase in the sale of commercial vehicles is noticed throughout the country. The use of these motor cars is being extended and the manufacturers are looking for good business in this line. The H. H. Franklin Manufacturing Company delivered last week a 16-horsepower one-and-a-half ton truck to Philadelphia and one to Easton, Pa., and has orders for immediate delivery from Memphis, Tenn., New York, Denver and other points. The Model J Franklin trucks, which are constructed along the Franklin lines of light weight and air-cooling, each do the work of three horses at the Franklin factory.

Jason Silve, who drives the mammoth Warner autometer about the country, showing up the absurdity of the speed laws, started from Chicago for the Warner factory in Beloit, Wis., during the recent February blizzard. When he got as far as Elgin, Ill., he was compelled to stop and turn around. Time after time he was forced to get out and prop the huge instrument to prevent it from toppling over. This was rendered necessary from the fact that the instrument is 9 feet 6 inches in height and weighs 800 pounds, with the weight mostly at the top. The big autometer will be completely overhauled when it arrives at the factory, and will be ready for its second summer of touring.

Gabriel horns are finding favor with the crowned heads of Europe. Brown Brothers, the European agents, have recently sold one to Alfonso XIII., King of Spain, for use on the royal auto, and a Gabriel has also found its way into the imperial garage at Berlin, where it graces one of the cars of the Emperor William. It was the birthday gift of his brother, Prince Henry of Prussia. The Emperor has ordered two more of his cars to be equipped with Gabriels. King Edward of England has had a Gabriel on his car for a couple of years, and the Czar of Russia has recently purchased one, as has also Dowager Queen Margherita of Italy. The inventor of the horn, C. H. Foster, has recently invented a shock absorber and given it the name of Gabriel.

A. L. Kull, sales manager and vice-president of the Dragon Motor Company, has returned from a Western trip to New York City and will remain there for a week or two before removing to Philadelphia for the spring. Mr. Kull states that he found trade improving in the West and a general feeling of hopefulness among manufacturers and dealers. One of the noticeable features was the demand in all the Western cities for taxicabs. There is a decided trend toward adopting the taxicab for street use in all American cities of any note, says Mr. Kull, and it appeared to him that it would be several years before this demand could be satisfied, no matter how industriously the various manufacturers now in the cab business worked at the task.

The Archer, Combs & Winter Company is the title of a newly organized corporation which has recently begun business in Portland, Ore., its headquarters being located at 306 Oak street. The officers are P. A. Combs, president and treasurer; A. J. Winters, vice-president, and Samuel B. Archer, secretary. The capital stock is $20,000, fully paid in, and the corporation will make a specialty of handling automobile accessories, fishing tackle and sporting goods, doing a jobbing business entirely. The members of the new firm have a wide experience in these lines in Oregon, Washington and Idaho, having been identified with selling goods of this class at wholesale for a number of years. They control a number of specialties for the above territory as manufacturers' agents.

"We don't need a snow plow," said E. R. Thomas when asked as to the practicability of fitting a rotary plow to the front of America's defender in the big race. "Only in extreme cases is it necessary to use outside means to get the car through. Recently we ran a Flyer through from Buffalo to Boston, through the Berkshires, through snowstorms, snow drifts, ice and mud, and only twice resorted to shovels. Each time a very little work, merely clearing away the snow which had packed in front of the car, was sufficient. There is no doubt that a successful rotary snow plow could be designed by our engineers and the power of the motor is much more than sufficient to drive such an apparatus in addition to propelling the car. Such an arrangement might be of great service in extreme cases, but its service at such a time would not offset the disadvantage of carrying it when not needed. It is only in extreme cases that such an arrangement would be used, and we firmly believe that the Thomas Flyer is fully capable of overcoming all but most extraordinary conditions found on American roads."

NEW AGENCIES ESTABLISHED.

Cimiotti Brothers, 1843 Broadway, have taken up the sale of the York Pullman automobiles for the territory of Greater New York, Long Island and Westchester county.

J. H. Rogers, late of the Diamond Rubber Company, Chicago, and W. H. Roesch, formerly of Dawson Brothers, that city, have formed a partnership and taken the agency for the Wisconsin tire protector, manufactured by the Tire Protector Company, of Stevens Point, Wis. Their new offices are located at 1229 Michigan avenue, Chicago.

The Babcock Electric Carriage Company has met with such success with its New York branch, established last November, that it has decided to establish a branch in Chicago, which is located at 1328-1330 Michigan avenue, in the heart of the automobile trade district. C. M. Atterbury has been appointed manager.

PERSONAL TRADE MENTION.

B. F. Blaney has just been appointed sales manager of the Selden Motor Car Company, Rochester, N. Y., and has entered upon his duties of placing the Selden agencies. This duty previously devolved upon the designer of the car, E. T. Birdsall.

E. Le Roy Pelletier, the well-known publicity and advertising manager, is now doing Italy, but will sail from Naples the latter part of this week homeward bound. He returns to take charge of Maxwell publicity, with headquarters in New York City.

W. H. Cameron has been appointed manager of the repair department of the Gibson Automobile Company, Indianapolis, Ind., who handle the Ford, Premier and Reo lines, and will conduct that part of the business under the name of the Automobile and Tire Repair Company.

Owing to the resignation of Mr. Vanderhoff, as manager of the Philadelphia branch of the Ford Motor Company, Louis Block, who has been in charge of the Buffalo branch, will transfer his headquarters to the Quaker City, while Roger Stearns, who has been acting as assistant to Gaston Plaintiff, of the New York branch, will take charge at Buffalo.

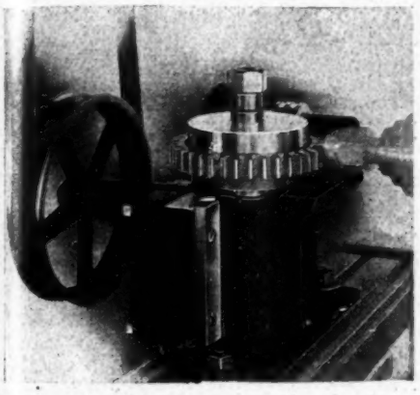
NEW TRADE PUBLICATIONS.

A house organ is now produced by the Autocar Company, Ardmore, Pa., under the title *Autocar Life*. Its object is to keep Autocar owners informed of doings in their own particular world, and, to judge by the style of the special show number just to hand, this is thoroughly attained.

Bridge whist and automobiling are combined in the publication by the Peerless Motor Car Company, Cleveland, O., of a bridge whist score book, on the heading of each page of which is a scene on the highway when touring in a Peerless. At the end individual scores are forwarded and rules for playing whist are given in full. The idea is an excellent one, and the publication should be a success. Automobilists can obtain copies on request at the headquarters of the company.

INFORMATION FOR AUTO USERS

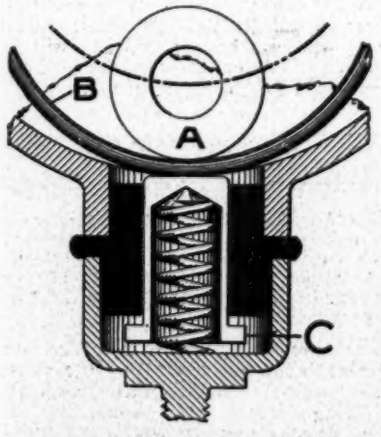
New Tooth-Chamfering Attachment.—Chamfering of the spur gear teeth of the pinions of an automobile gear-set may appear to be a matter of minor importance, but it is one of those little things that have contributed to make the automobile a success. Automobile manufacture nowadays is made up almost entirely of details, and success in this field is coming to be more



LONG-ARM TOOTH-CHAMFERING ATTACHMENT.

and more a question of economy in carrying out these multitudinous details of construction in a first-class manner. This is where the value of special machine tools and attachments such as that shown here, which has just been perfected by the Long Arm System Company, Cleveland, O., contribute to successful automobile building. The Automatic Tooth-Chamfering attachment does the work more uniformly and in better shape than it is possible to do it by hand, or by any of the make-shift devices adopted in many shops. It also does the work more rapidly, and that means economy.

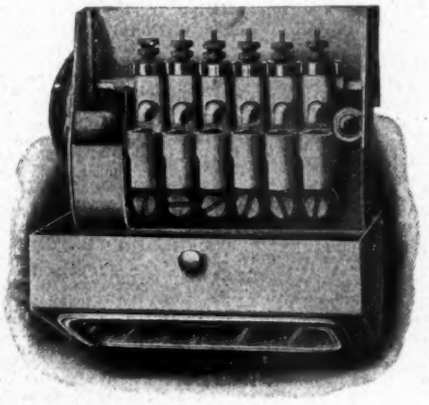
Wico Roller Timer.—One of the latest specialties added to its line of ignition apparatus by the Witherbee Igniter Company, 541 West Forty-third street, New York City, is known as the Wico Ring and Roller Timer, Wico being the trade



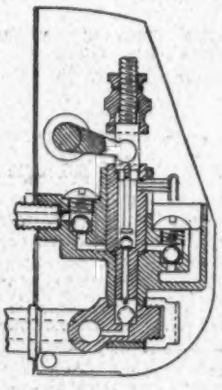
DETAILS OF WICO ROLLER TIMER.

name under which this concern puts out all its ignition specialties, with the exception of the well-known Witherbee Igniter, or storage battery. It is constructed on a novel principle, consisting of a loose ring, which is rolled upon the different contact points as it revolves. The difference between the diameter of this loose ring and its containing case in which it rolls is such as to assure a constantly changing point of contact for the action of the current, the slight abrasion consequent upon this action and its impact being thus distributed over a comparatively large area. When rolled upon a contact point this ring acts as a direct conductor for the current into the case proper, bridging a gap of about 1-4 inch and reducing the resistance to practically nothing. It also distributes the effect of the resulting arc over its entire periphery. This loose ring consequently takes practically all the mechanical wear from the roller inside, and the action of the current outside, over an area much greater than the combined areas of similar surfaces on the usual type of timer. It may be replaced at nominal cost in a few minutes. The tool-steel contacts are hollow and contain a bronze spring, holding them uniformly in position. They are contained in a fiber tube extending nearly through the case, so that the ring cannot come in contact with the insulation.

McCanna Multiple Pump Oiler.—Lubricators of this type have many advantages, as the accidental derangement of any one of the pumps does not interfere with the working of others and consequently the supply to the remaining bearings goes on unimpeded. Each pump may be adjusted to deliver a different quantity of oil according to the bearing it is feeding, and any one of the pumps may be operated by hand at any time without changing the adjustment. A single pipe leads from the reservoir to the pumps, with a direct pipe from each pump to the point to be lubricated, the pumps themselves being constructed on approved hydraulic principles, thus insuring long and reliable service. The oil tank may be placed at any easily accessible point under the hood, body or seats, thus removing this encumbrance from the dash and keeping the floor boards clean. Kerosene may be fed to any point desired and in any quantity, merely by putting in the sight feed chamber of the respective pump, thus making it possible to flush out any of the leads without taking down anything. A small electric light is provided to show the oil feeds at night. These multiple pump oiling systems are made in any number of leads from one to twelve for automobile use by the McCanna Manufacturing Co., 56 N. Jefferson street, Chicago.



M'CANNA MULTIPLE PUMP OILER, CASE REMOVED



M'CANNA PUMP.

Breech-Block Clip Handle.—One of the new features of the Breech Block spark plug, manufactured by the Standard Company, Torrington, Conn., is the terminal clip handle shown by the accompaying illustration. The handle is of enameled wood, and is inserted in the clip in place of a cable, the regular cable clip being attached to the Breech Block clip with a small brass screw and nut, which are furnished with each plug. The cable thus attached to the clip at right angles renders the clip easily removable from the plug, as the cable, instead of being pulled against itself, acts as a hinge. The handle is an insulator, and is very convenient for ignition testing purposes.

BREECH-BLOCK CLIP HANDLE.

Raybestos Brake Lining.—To meet the demand for a brake lining combining great wearing qualities and high heat-resisting power to stand constant application on long hills, the Royal Equipment Company, Bridgeport, Conn., has recently placed on the market a new brand of brake lining known as the "Raybestos." It is composed of asbestos woven with wire, and subjected to a special treatment, from which it obtains its adhesive qualities. It is claimed by the makers to have an unlimited wearing life, while no amount of heat can affect it. This company was one of the first to place a brake lining on the market, their "Stability" brand being well-known for several years past. It consists of a closely woven duck given a special treatment, securing adhesive and wearing qualities. It has a life of more than 10,000 miles' running, and is suitable for both light and heavy cars when not used constantly on stiff and long grades.

Auto-Top Gloss.—This is an elastic preparation for preserving and restoring the natural luster and finish of automobile and carriage tops, seats, guards, straps and the like, whether made of leather, Pantasote, rubber or similar material. It is manufactured by the James W. Cummer Company, 2901 East Thirty-fourth street, Cleveland, O., and is easily and quickly applied. The makers guarantee it not to crock or peel off, and one gallon is sufficient to restore and keep in first-class condition for an entire season all the accessories of this nature to be found on a car. As the average autoist allows his car to stand for long periods with the top folded, this treatment is very necessary for the preservation of the leather.

INDEX TO ADVERTISERS

Acetylene Gas Illuminating Co. 61
Acme Motor Car Co. 64
Adams Co. 64
Add-Wear Auto Tire Sleeve Co. 65
Aerocar Motor Co. 64
Ajax-Grieb Rubber Co. 92
Almy Water Tube Boiler Co. 60
American Ball Bearing Co. 85
Am. Brass & Alum. Works. 66
Amer. Motor Car Sales Co. 104
American Motor Truck Co. 88
Anderson Forge & Machine Co. 66
Apperson Bros. Automobile Co. 95
Ashtabula Bow Socket Co. 63
Ashton Valve Co. 72
Atlas Motor Car Co. 64
Auburn Automobile Co. 64
Audel & Co., Theo. 72
Aurora Motor Works. 97
Austin Automobile Co. 71
Auto Pump Co. 68
Auto & Supply Co. 65
Autocar Co. 100
Autocar Equipment Co. 93
Automobile Supply Co. 60
Automobile Utilities Co. 60
Auto-Shine Co. 61

Baldwin Chain & Mfg. Co. 66
Barnett Drop Forging Co. 73
Bartholomew Co. 88
Beaver Mfg. Co. 61
Behen-Faught Motor Car Equipment Co. 61
Beilfuss Motor Co. 84
Beloit Supply Co. 89
Blasier Mfg. Co., M. E. 63
Blomstrom Mfg. Co. 72
Boker & Co., H. 66
Bosch, Robert 99
Boston Auto Gage Co. 67
Bowser & Co., S. F. 86
Boyle & Co., John 110
Brown Co. 90
Brown, Wm. W. 60
Brownell Motor Co., F. A. 66
Brush Runabout Co. 94
Buckeye Jack Mfg. Co. 83
Buckeye Mfg. Co. 64
Buffalo Carbureter Co. 83
Bullard Automatic Wrench Co. 84
Buob & Scheu 63
Byrne-Kingston Co. 91

Cadillac Motor Car Co. 64
Cameron Car Co. 73
Canton Drop Forge & Mfg. Co. 66
Capitol Auto Co. 63
Carr, F. S. 63
Chadwick Engineering Works. 75
Champion Co., A. 69
Chandlee & Chandlee 68
Chicago & Alton Railway 67
Clark, E. S. 60
Cleanola Co. 68
Cleveland Motor Car Co. 96
Cleveland-Canton Spring Co. 84
Columbia Lubricants Co. 82
Comptoir d'Innovations pour Automobiles 98
Conn. Tel. & Elec. Co. 93
Continental Caoutchouc Co. 65
Continental Motor Mfg. Co. 65
Corbin Motor Vehicle Corp. 88
Cornish-Friedburg Motor Car. 64
Correspondence School of Motor Car Practice 59
Cotta, Chas. 68
Cowles & Co., C. 60
Crown Battery Co. 82
Crown Soap Co. 84
Cullman Wheel Co. 66
Cummer Co., Jas. W. 73

De Luxe Motor Car Co. 64
Diamond Chain & Mfg. Co. 66
Diamond Rubber Co. 101
Dietz Co., R. E. 69
Dixon Crucible Co., Joseph 68
Dorris Motor Co. 88
Dover Co., Geo. W. 59
Dow Portable Electric Co. 61
Duff Mfg. Co. 63

Echo Horn Co. 86
Eclipse Machine Co. 60
Eco Mfg. Co. 90
Edgar Mfg. Co. 60
Edmunds & Jones Mfg. Co. 60
Eldredge Electric Mfg. Co. 67
Elite Mfg. Co. 65
Ellsworth, J. M. 103
Elmore Mfg. Co. 101
Empire Automobile Tire Co. 68
Excelsior Supply Co. 71

Firestone Tire & Rubber Co. 65
Fisk Rubber Co. 87
Forest City Motor Car Co. 97
Franklin Mfg. Co. 80
Fry, T. C. & W. L. 60

G & J Tire Co. 82
Gabriel Horn Mfg. Co. 82
Garford Motor Car Co. 96
Gearless Transmission Co. 62
Geiszler Bros. 65
Gemmer Mfg. Co. 84
General Accumulator & Battery Co. 61
Gibney & Bros., Jas. L. 59
Goldberg Motor Car Device Mfg. Co. 79
Gray & Davis Cover
Grout Bros. Auto Co. 108

Ham Mfg. Co., C. T. 82
Hans, Edmund E. 92
Hardy Co., The R. E. 67
Harris Oil Co., A. W. 61
Hartford Suspension Co. 66
Hatcher Auto Parts Co. 83
Hatfield Motor Vehicle Co. 64
Haynes Automobile Co. 95
Healy Leather Tire Co. 65
Hedgeland Mfg. Co. 97
Heinze Electric Co. 85
Heitger Carbureter Co. 60
Hercules Auto Specialty Co. 92
Herz & Co. Cover
Hess-Bright Co. 66
Hicks Speed Indicator Co. 84
Hoffecker Co. 60
Hoffman, Geo. W. 60
Holley Bros. Co. 90
Holsman Automobile Co. 71
Hopewell Bros. 65
Hotel Fredonia 81
Hotel Piney Woods Inn 81
Hotel Rudolph 81
Hotel Tower 81
Hotel Westminster 81
Howard Motor Works. 64
Hoyt Electrical Ins. Co. 72

Imperial Motor Car Co. 64
Indestructible Steel Wheel Co. 63

Jackson Automobile Co. 64
Jamesville Mfg. Co. 61
Jeannin Auto & Mfg. Co. 88
Jeffery & Co., Thos. B. 102
Jeffery-Dewitt Co. 61
Jencick Motor Mfg. Co. 83
Jenkins Specialty Mfg. Co. 84
Johnson Sporting Goods Co., I. 67
Jones Speedometer 61

K. W. Ignition Co. 61
Kellom Co., Chas. F. 69
Kent Mfg. Works, A. 67
Kimball Tire Case Co. 68
King Top Mfg. Co. 63
Kinsey Mfg. Co. 63
Kissell Motor Car Co. 64
Konigslow, Otto 66

Lansing-Mahon Press 86
Lavalette & Co. 61
Lavigne Mfg. Co. 63
Lear Automobile Co., Oscar. 64
Leather Tire Goods Co. 65
Limousine Carriage Mfg. Co. 63
Lipman Mfg. Co. 60
Lobee Pump Co. 66
Locke & Co. 85
Lockwood Bros. 67
Locomobile Co. 64
Logan Construction Co. 64
London Auto Supply Co. 63
Long Mfg. Co. 84

McCord & Co. 71
Maja Co. Cover
Manhattan Electrical Sup. Co. 60
Manhattan Storage Co. 61
Masury & Son, John W. 89
Mathewson Motor Car Co. 99
Maxwell-Briscoe Motor Co. 111
Mayo Radiator Co. 63
Merchant & Evans Co. 87
Merritt & Co. 60
Metzger, C. A. 93
Michelin Tire Co. 73
Midgley Mfg. Co. 66
Miller & Starr 65
Miller, Chas. E. 83
Mitchell Motor Car Co. 96
Model Automobile Co. 64
Moline Automobile Co. 64
Montgomery-Washburn Co. 85
Moon Motor Car Co. 64
Mora Motor Car Co. Cover
Morgan & Wright 91
Mosler & Co., A. R. 63
Moss Photo Engraving Co. 92
Motz Clincher Tire & Rub. Co. 65
Mound Tool & Scraper Co. 82
Mutty Co., L. J. 63

National Auto Accessories Co. 61
National Brake & Clutch Co. 56
National Motor Vehicle Co. 108
Neustadt Auto & Supply Co. 86
Never-Miss Spark Plug Co. 61
New England Motor Co. 87
New York Gear Works. 72
Nichols & Co., D. P. 63
Nordyke & Marmon Co. 106
Northway Motor & Mfg. Co. 71
Northwestern Storage Battery Co. 91
Nuttall Co., R. D. 66

Ofeldt & Sons 60
Olds Motor Car Co. 106
Owen & Co., R. M. 64

Pacific Tucking & Mfg. Co. 60
Packard Electric Co. 61
Packard Motor Car Co. 105
Palmer & Singer Mfg. Co. 64
Pantasote Co. 63
Parish & Bingham Co. 66
Parker, Stearns & Co. 83
Penn. Auto Motor Co. 64
Perfection Grease Co. 87
Perfection Spring Co. 66
Peugeot Frères 66
Pfanstiehl Elec. Laboratory. 60
Picrome Hide Co. 66
Pierce Engine Co. 64
Pioneer Brass Works. 66
Pirelli & Co. 65
Pittsfield Spark Coil Co. 70
Precision Appliance Co. 61
Premier Motor Mfg. Co. 107
Prest-O-Lite Co. 72
Progressive Mfg. Co. 72

Quinby Co., J. M. 63

Raimes & Co. 62
Rainier Co. 65
Rajah Auto Supply Co. 68
Randall-Faichney Co. 85
Reeves Pulley Co. 69
Remy Electric Co. 61
Renault Frères Cover
Republic Rubber Co. Cover
Richardson Engineering Co. 70
Robert Instrument Co. 60
Ross Gear & Tool Co. 66
Royal Equipment Co. 66-67
Rushmore Dynamo Works. 100

Salisbury Wheel & Mfg. Co. 60
Samson Leather Tire Co. 65
Sanford Mfg. Co., F. C. 66
Saxon Lamp Co. 61
Seaboard Florida Limited. 78
Selden Motor Vehicle Co. 94
Shaler Co., C. A. 70
Shawver Co. 61
Smith Co., A. O. 89
Smith Mfg. Co., R. H. 83
Spacke Machine Co., F. W. 73
Spare Motor Wheel of Am. 90
Speed Changing Pulley Co. 82
Spicer Universal Joint Mfg. Co. 66
Splitdorf, C. F. 61
Sprague Umbrella Co. 94
Standard Automatic Lub. Co. 61
Standard Battery Connection Co. 72
Standard Co. 93
Standard Connecting Rod Co. 69
Standard Roller Bearing Co. 66
Standard Welding Co. 85
Steam Carriage Boiler Co. 63
Stearns Co., F. B. 65
Stevens-Duryea Co. 98
Stewart & Clark Mfg. Co. 67
Streit Machine Co. 61
Studebaker Automobile Co. 88
Success Auto Buggy Co. 65
Supplementary Spiral Spring. 69
Swinehart Clincher Tire Co. 82
Syracuse Aluminum & Bronze Co. 66

Thomas Motor Co., E. R. 74
Thompson Sons Co., J. P. 71
Timken Roller Bearing Axle Co. 104
Tincher Motor Car Co. 95
Torbensen Motor Car Co. 73
Tray Plate Battery Co. 82
Trebert Gas Engine Co. 65
Troy Carriage Sunshade Co. 91
Tucker, C. F. 60

Uncas Specialty Co. 68
U. S. Fastener Co. 85

Veeder Mfg. Co. 89
Vehicle Specialty Corporation. 70

Walker Mfg. Co., E. C. 70
Waltham Mfg. Co. 76-77
Warner Instrument Co. 78
Warner Pole & Top Co. 63
Watt-Detroit Carbureter Co. 81
Waukesha Motor Co. 73
Wayne Automobile Co. 65
Weed Chain Tire Grip Co. 67
Welch Motor Car Co. 88
Western Motor Co. 83
Weston Elec. Instrument Co. 95
Wheeler & Schebler 110
White Co., The 109
Whitney Mfg. Co. 87
Winton Motor Carriage Co. 112
Witherbee Igniter Co. 67-96
Wright Cooler & Hood Co. 86
Wyman & Gordon Co. 59

York Motor Car Co. 100

CORK INSERTS

(Patented)

in any type of Clutch or Brake give results not otherwise obtainable

In 1908 Cork Inserts will be used in 15,000 cars

Leather-Faced Cone Clutches

George N. Pierce Co.
Garford Co.
Pope Mfg. Co.
St. Louis Car Co.
Dayton Motor Car Co.
Acme Motor Car Co.
Mora Motor Car Co.
Olds Motor Works.
Selden Motor Vehicle Co.
Studebaker Automobile Co.
Tiley-Pratt Co.
"Long-Arm" System Co.
Conover Motor Car Co.
Kirkham Motor Mfg. Co.
Reliance Motor Car Co.
York Motor Car Co.

Metal-to-Metal Cone Clutches

Knox Automobile Co.
De Luxe Motor Car Co.
Napier Motor Car Co.
Roberts Motor Car Co.
Mack Bros. Motor Car Co.
Chadwick Eng. Works.
Cameron Motor Car Co.

Three-Plate Disc Clutches

Autocar Co.
E. R. Thomas Motor Co.
Nordyke & Marmon Co.
American Machine Mfg. Co.
Model Automobile Co.
Abendroth & Root Mfg. Co.

Expanding Ring Clutches

Coppock Motor Car Co.

Five-Plate Disc Clutches

Dolson Automobile Co.
Continental Motor Mfg. Co.
Klink Motor Car Mfg. Co.
New York Car & Truck Co.
Imperial Motor Car Co.

Multiple Disc Clutches

Rainier Co.
Stevens-Duryea Co.
Nordyke & Marmon Co.
Northway Motor & Mfg. Co.

Brakes

F. B. Stearns Co.
Matheson Motor Car Co.
Chadwick Eng. Works.
Knox Automobile Co.
Royal Motor Car Co.
Premier Motor Mfg. Co.

NATIONAL BRAKE AND CLUTCH COMPANY, Owner and Patentee, 16 State Street, BOSTON

STANDARD BRAKE COMPANY, Representative, 101 West 66th St., NEW YORK